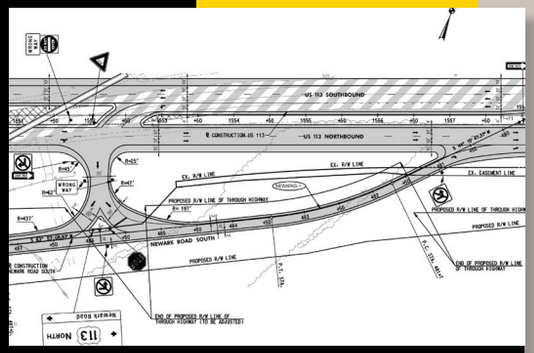
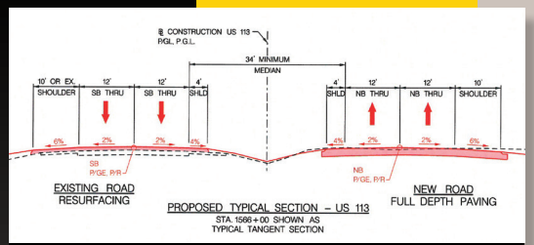
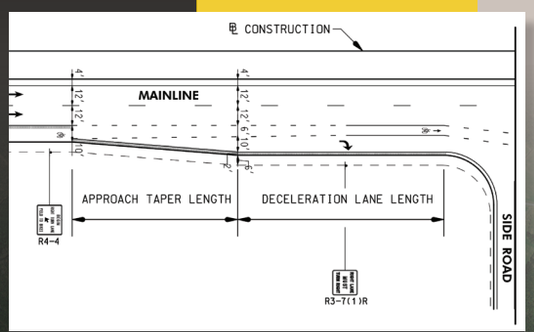


Improved Safety at Newark Road Intersection



Normal Crown Typical Section



Bicycle Pocket Lane at Dedicated Right Turn Lane

SHA State Highway Administration
Maryland Department of Transportation

Technical Proposal

Contract No. W06365170

F.A.P. No. AC-NHPP-327-1(37)N

US 113 (Phase 3) – From North of Massey Branch to Five Mile Branch Road

DESIGN-BUILD

Worcester County

Date: November 10, 2014

American Infrastructure

WALLACE MONTGOMERY

TABLE OF CONTENTS

2.09.02 Project Technical Elements and Approach

2.09.02 PROJECT TECHNICAL ELEMENTS & APPROACH

PROPOSED PROJECT IMPROVEMENTS

The US 113 corridor functions as a major artery serving commuters, commercial trucking, and summer vacationers traveling along the Delmarva Region. US 113 (Worcester Highway) is classified as a principal arterial on the National Highway System extending from Pocomoke City in Worcester County, MD to Milford, DE with a posted speed of 55 mph. While much of the US 113 corridor through Maryland has been constructed as a 4-lane highway, the remaining two phases of US 113 located in the south continue to operate as a 2-lane facility. Historically, portions of US 113 have higher than statewide average accident rates. The Purpose and Need for the US 113 corridor was stated to "improve safety conditions and traffic operations" in the Final Environmental Impact Statement.

EXISTING CONDITIONS – The AI/WM Team has a thorough understanding of the PROJECT corridor, existing conditions, and constraints. The existing typical section consists of 2-12 ft. wide travel lanes in each direction in an open section normal crown roadway (superelevated through curves) with paved shoulders varying from 6 to 8 ft. Included within the PROJECT limits are three existing intersections at Basket Switch Road, Newark Road, and Langmaid Road. Additional access considerations include various farms and residences as well as the Worcester County Sanitary District Facility. There are no existing pedestrian facilities within the limits of work.

Based on the Environmental Features Map provided, there are 10 wetland/Waters of US areas, specifically at Sta. 1450 to 1452, West of US 113 at Sta. 1468, Sta. 1481, West of US 113 at Sta. 1489, Sta. 1503, Sta. 1536, Sta. 1540, Sta. 1554 to 1564, Sta. 1578, and Sta. 1588. There are forest habitat work limitations from May through August on the Southern end of the PROJECT (Sta. 1509 and South). From Sta. 1548 to 1553, there is an at-grade crossing for the Maryland and Delaware (MD/DE) Railroad. Aerial utilities run throughout the corridor along both sides of US 113 along with an underground communication facility. There are 11 minor roadway cross culverts (12-inch to 24-inch in diameter) and 4 major culverts which include an existing 72-inch box culvert (Sta. 1481), and 42-inch (Sta. 1536), 60-inch (Sta. 1578), and 36-inch (Sta. 1590) round pipe culverts.

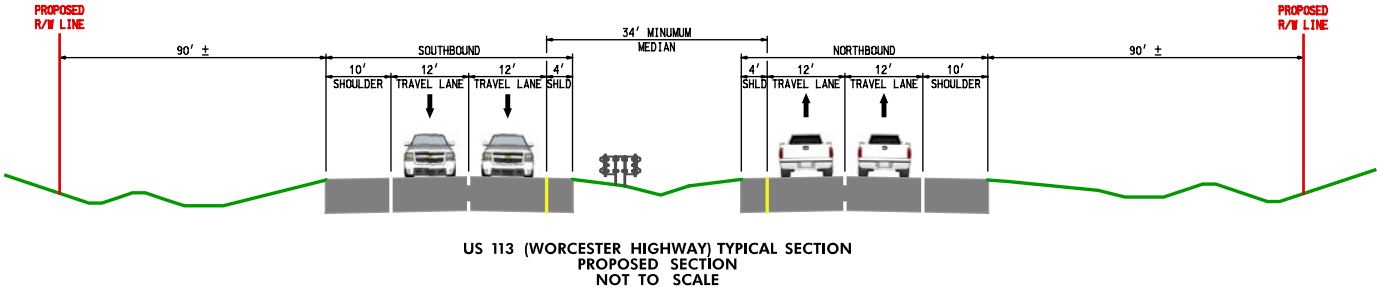
PROJECT SCOPE – The project scope consists of the design and construction of two additional lanes along the existing alignment to create a dual divided four-lane highway. A portion of the corridor is on new alignment for the at-grade crossing of the MD/DE Railroad. In consideration of intersection safety improvements, connecting side roads' direct through movements will be eliminated and direct left turn movements unto US 113 will be mitigated through the use of J-Turns and Maryland "T" intersections. As part of the Access Management Plan for the corridor, driveways/entrances along US 113 will be consolidated through new service roads to minimize direct connections onto US 113. The length of the PROJECT is approximately 4 miles. Specific improvements include:

- New pavement construction and pavement rehabilitation of existing roadways and shoulders;
- Bicycle compatible facilities through corridor and intersections;
- Roadway tie-ins, including a temporary cross-over from the new dualized highway to the existing two-lane road at the Southern project limit;
- Closed/open drainage systems and culvert extensions/replacements;
- Stormwater management quality and quantity facilities; and
- Roadway intersection lighting and signing & pavement markings.

GEOMETRY / PROFILE – The AI/WM Team design will adhere to the horizontal alignment for US 113 Mainline as defined in the RFP. The proposed alignment generally matches the existing alignment with a realignment from Sta. 1526 to 1554 that supports a new intersection configuration with Newark Road South and improves the angle of crossing with the MD/DE Railroad from 20˚ to 28˚. Conversely, the proposed road profile needs significant refinement. We recognize that the profile as provided is conceptual, however we are observing locations where 2-3 feet differential on existing pavement is the resultant differential. In the final profile, we will seek to minimize the PROJECT footprint, impacts, and borrow requirements. Grades will generally be flat in keeping with existing terrain and low points are not expected to move substantially.

TYPICAL SECTIONS – The proposed typical section is consistent with corridor-wide improvements and includes a 34 ft. minimum width median. Outside shoulders are generally 10 ft. wide, except when auxiliary lanes are present they are reduced to 8 ft. combined paved and graded. W-beam traffic barrier location, fill slopes, and clear zones are undefined on the advertised documents. Where feasible and appropriate, we propose to implement a maximum fill slope of 4:1 (side slopes) in order to provide a recoverable area which minimizes the need for W-beam traffic barrier. According to the AASHTO Roadside Safety Manual, a clear zone of 30-feet (from edge of travelway) is required for speeds equal or greater than 55 mph. As reflected in Figure 2.09.02.1, the AI/WM Team is proposing to crown the northbound and southbound roadways to more efficiently drain the pavement on normal crown tangent sections during a rainstorm through dispersing runoff equally to the median and roadside area and furthermore enhancing safety vehicular traffic.

Figure 2.09.02.1 Crown Northbound and Southbound Roadways



PROJECT GOALS – The AI/WM Team has developed a technical approach focused on delivering a safe, cost-effective, and low maintenance 4-lane median divided highway facility ahead of schedule. The PROJECT's goals will be achieved by optimizing the design to improve safety and minimize construction impacts; sequencing construction to facilitate concurrent acquisition of right-of-way and relocation of impacted utilities; planning construction operations comprehensively to address safety and environmental concerns; maintaining existing traffic operations including access; and collaboratively coordinating with SHA and project stakeholders. Specific elements of our approach to design and construction that support achieving the PROJECT's goals include:

- ***Corridor Wide Safety & Mobility:*** Bicycle Pocket Lanes provide operational and safety benefits (ATC #3). The AI/WM Team improved the skew of the bicycle crossing at the railroad. In addition, a safer intersection configuration is proposed at Newark Rd South by eliminating turning movement conflicts (ATC #4).
- ***Effective Access Management:*** Potential locations have been identified for emergency crossovers to still provide access control while minimizing delays for emergency responders. Safety enhancements are provided at the southbound lane drop roadway crossover at the Southern project limit (ATC #2).
- ***Durable and Maintainable Facility:*** Design optimizations that improve durability and reduce future maintenance include crowning the northbound and southbound roadway independently, utilizing wet swales, adjusting the profile to minimize grade differentials, replacing existing pipes, and installing multi-pipe configuration in lieu of replacing box culverts.
- ***Minimize Environmental/FIDS Impacts:*** Adjusting the profile reduces fill requirements and eliminating off-site drainage collection ditches where feasible minimizes environmental disturbance and avoids potential impacts to FIDS.
- ***Schedule and Economic Benefits:*** Revising the pavement section as proposed (ATC #1) provides a cost savings while exceeding the structural requirements, reducing construction impacts, and compressing the schedule by requiring less lifts of asphalt during pavement construction. Design optimizations for pavement crown, vertical profile, and small pipe structures provide cost and schedule savings.

EMERGENCY RESPONSE

Public safety is a driving force behind the dualization of US 113. Emergency responders include the Newark Volunteer Fire Department (VFD), VFD support from Berlin and Snow Hill, Worcester County Sheriff's Department, Maryland State Police (MSP), and Atlantic General Hospital. Newark VFD serves the area from Cedartown Road to Downs Road including approximately 3,000 homes and generally accesses US 113 via Langmaid Road and Newark Road. The Worcester County Sheriff's Department is located to the south of the PROJECT in Snow Hill MD and MSP are located at the US 113 / US 50 Interchange approximately 7 miles to the north of the PROJECT. The nearest hospital is Atlantic General Hospital located at the US 113 / US 50 Interchange. Various elder care facilities are a source for manage emergency calls and include the Berlin Senior Center, Gulf Creek Retirement Community and Snow Hill Nursing & Rehab Center.

The AI/WM Team will work with local emergency responders to assure that delays are avoided and accessibility is maintained. Our Team has designated an emergency response liaison that will coordinate with all Emergency Responders and attend regular progress meetings with representatives from each Emergency Response Agency. Our approach to minimizing delays and ensuring public safety includes optimizing the conceptual design, minimizing the type/duration of impacts, designing temporary/permanent features that meet applicable criteria, and coordinating with the appropriate parties prior to implementing changes in traffic configurations.

MINIMIZING DELAYS TO EMERGENCY RESPONDERS – Technical elements that minimize delays and ensure safety of responders and the public include both design and construction considerations.

Design Considerations – The Concept Plans provide for a design that will affect emergency response access due to new median barrier and intersection configurations. We offer the following recommendations for design:

Intersection Emergency Crossover - A Maryland "T" Intersection at Langmaid Road with curbs and an island will obstruct direct fire access to the East. A potential solution is to modify a short portion of the curb North of the island to be mountable curb and allow fire equipment to move directly through the intersection as they are able to do today. The intersection crossover design will accommodate the SU and Fire Engine vehicles.

Median Emergency Crossovers - The revised alignment of Newark Road will preclude emergency responders from accessing a lengthy area of US 113 between Sta. 1467 to Sta. 1541 (1½ miles). There are homes and commercial establishments in this area. A possible solution is to add emergency median crossovers at intervals through this stretch. Since emergency responders will have lights and sirens; acceleration and deceleration lanes are not required. Possible locations for these crossovers could be at Sta. 1484 and Sta. 1541. *A crossover at Sta. 1484 reduces the emergency vehicle's travel distance to respond to the chicken farm at Access Road F by 2/3 mile. A crossover at Sta. 1541 reduces emergency vehicles travel distance by 2½ miles in responding from the South (traveling Northbound) to access the Wells (Sta. 1540) and Serman (Sta. 1528) properties along the Southbound roadway.*

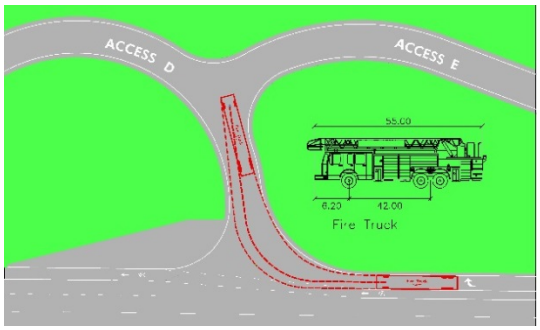
By implementing the potential emergency crossover locations, Responder's travel distances will be reduced by more than 3 miles.

Construction Considerations – Temporary traffic staging and temporary crossovers will be installed in accordance with MUTCD and SHA standards. Prior to the start of construction, an emergency contact list will be generated and distributed to SHA staff, emergency responders, and other stakeholders as necessary. All coordination requirements, preparations, and lines of communication will be clearly articulated in the Team's TMP. Variable message signs will be utilized to notify the public prior to a major traffic switch. For short duration operations that require flaggers, our Team will notify and coordinate with the Newark VFD. Should an emergency occur during a short term lane closure, on-site construction staff will ensure access is provided for emergency responders. Prior to reconfiguring access points and installing service roads, individual notifications will be provided to impacted residences and farms. We will coordinate with emergency responders and provide notification prior to changing access point.

Providing temporary crossovers for use by emergency responders during construction of the permanent intersections exceeds PROJECT requirements.

VEHICLE CHARACTERISTICS – The vehicles serving the Newark VFD are not large fire vehicles. Their largest vehicle is an Engine Truck, dual axle, 55' in length. Other vehicles include paramedic/ambulance, pumper trucks and large pick-up trucks. We have analyzed the Engine Truck via AUTOTURN to confirm that turning movements on the side roads and access roads can safely be accommodated by the proposed design (See Figure 2.09.02.1). The Police Department vehicles are all SU Trucks and smaller. Mainline US 113 will be designed to support a WB-67 vehicle.

Figure 2.09.02.1 Fire Turning Movement

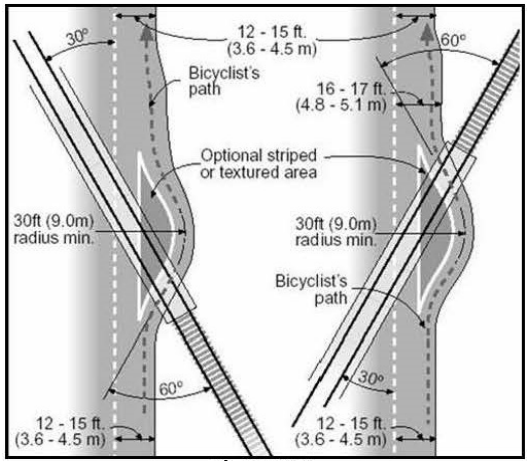


WATER TOWER ACCESS – The Newark Water Tower is located near Langmaid Road adjacent to town – also located relatively close to the VFD Facility. Since both the Tower and VFD are located on the west side of US 113, access to the Tower is not a critical issue relative to US 113 road construction. 10% of the VFD calls are from the immediate town area and they will use area hydrants for these calls. 90% of the VFD calls are "rural" which requires travel along US 113. In those cases, the VFD pumper trucks are using water from the Water Tower or they may draft water from nearby streams – for which access across US 113 is an important consideration.

BICYCLE ACCOMMODATION AT INTERSECTIONS

The RFP acknowledges that bicycle compatibility has not been fully accommodated by the RFP plans and requests that the DB Teams provide an ATC in order to address this deficiency. ATC #3 has been provided and is based upon *SHA Bicycle Policy & Design Guidelines* (dated May 2013). The key points of ATC #3 include:

Figure 2.09.02.2 Bicycle RR Crossing



- We propose to introduce a 6 ft. pocket lane next to the travel lane which then moves the 10 ft. deceleration lane to the right.
- Bicyclists shift from the pocket lane to the outside of the upcoming acceleration lane as they travel through the intersection, which is consistent with the SHA Bicycle Policy and Design Criteria. (It is advantageous to show "Puppy Track" stripes across the intersection to direct bicycles.)
- The addition of the Pocket Lane will add 2 ft. to the pavement width which will modestly increases impervious surface area and affects the roadside toe of slope. ATC #3 identified only minimal impact.
- Shoulder Rumble Strips at J-Turn intersections throughout US 113 create a problem for bicyclists wanting to make a left turn from shoulders to a side road or a U-Turn to return to an intersection. We propose to provide Rumble Strip Gaps as specified by SHA's G*uidelines for Application of Rumble Strips.*
- A severely skewed Railroad Crossing (28 Degrees) is part of the PROJECT and will create a major safety challenge for bicycles. We propose to widen the shoulders to allow a realigned bike path to cross the railroad at an angle between 60 & 90 degrees as suggested by SHA Bicycle Policy (See Figure 2.09.02.2).

MAXIMIZE OPERATIONS AND SAFETY

Challenged with a major SHA capital project and a corridor-wide accident history, the AI/WM TEAM will deliver on safety – through the travelway, roadside, and temporary work zone – to the maximum extent possible. We have an experienced staff of designers and constructors fully familiar with the means and methods to achieve safe construction of this roadway dualization project.

Critical Elements to Maximize Safety and Operations

- Intersection Design
- Access Management
- Railroad Crossing

CORRIDOR SAFETY BACKGROUND – One of the main objectives for the dualization of US 113 is to improve vehicular safety. The corridor has a history of severe crashes due to vehicles crossing the undivided centerline, often resulting in fatal head-on collisions. The dualization has proven to be effective in mitigating these types of crashes, but have introduced new safety concerns at intersections along the corridor. Severe right angle collisions began to occur with motorists at stop controlled intersections having to cross two sections of high-speed roadway, which requires yielding within the wide medians. At times the medians are not wide enough to accommodate larger vehicle lengths at these crossings, leaving them vulnerable to back side collisions.

Introducing unconventional intersection geometries such as Maryland T's and J-Turns have mitigated these intersection safety concerns. Eliminating the ability to cross both directions of US 113 and providing protection for side-street left-turning traffic merging onto mainline reduces the number of conflict points. Both types of intersections also provide better refuge for larger vehicles within the median.

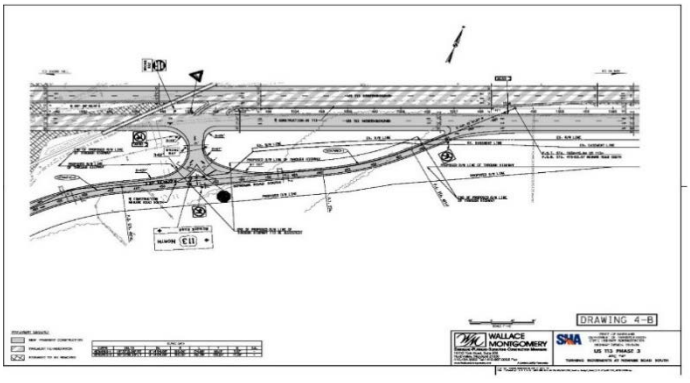
Our approach to maximize safety and operations will start with establishing final road alignments, superelevation criteria, intersection sight distances, acceleration/deceleration lengths, and roadside clear zones to exceed AASHTO and/or SHA criteria minimums. However given the corridor accident history; the presence of elderly drivers in the area; the presence of specialized and farm vehicles operating at varying speeds; coupled with the high percentage of trucks (24% of ADT) – additional design details which will be considered for implementation include:

- Review recent accident history to look for trends and challenges during MOT and permanent conditions;
- Provide detailed design of J-turns & MD "T" intersections from lessons learned on other US 113 work;
- Consider implementation of safety edges – per FHWA Every Day Counts program;
- Meet with representatives of C.R.A.S.H. to understand historical issues and establish dialogue; and
- Meet with farmers to understand their vehicles and schedules for farm vehicle access.

INTERSECTION DESIGN – There are only three existing intersections through the project limits. Intersections are very important elements with regard to safety for motorists and bicyclists (and pedestrians) on any highway project. However, this point is emphasized on the US 113 corridor, in light of the corridor safety history. Intersection considerations on US 113 are summarized as follows:

- ***Basket Switch Road*** – existing three-legged intersection (side road under stop control) serving relatively few residences and farms toward the east. The proposed improvements call for a Maryland "T" configuration. Access for farm vehicles are an important consideration in design since these vehicles must merge into the left lane then weave across the right lane to access the right shoulder. These improvements maximize safety for the local community.
- ***Newark Road South*** – existing four-legged intersection (side road under stop control) serving residences and farms and providing the "secondary" access to the town of Newark MD. The railroad crossing is in close proximity. The proposed improvements call for J-turn solutions, although the Concept Design appears operationally problematic. ATC #4 (see Figure 2.09.02.3) addresses the operational concerns with this proposed configuration, provides maximum safety and has been accepted by SHA. The modified intersection moves the southbound left turn movement (previously a J-Turn) South to Sta. 1552+50 separating it from the conflict with merging traffic from Newark Road South. To further reduce

Figure 2.09.02.3 Newark Road North at US 113



conflict points, we propose to eliminate the J-Turn Loon completely and direct U-Turn traffic making this movement to combine with Newark Road South and merge at a single point to US 113 Northbound.

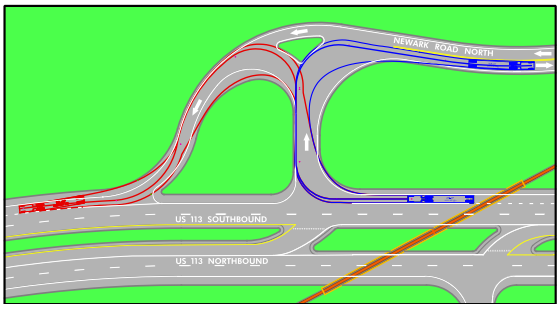
- ***Langmaid Road*** - existing four legged intersection under stop control with beacons serving residences and farms and providing the "direct" access to the town of Newark MD. The proposed improvements call for Maryland "T" and J-Turn solutions. Access for emergency vehicles will be addressed to minimize delays (see above). Signal removal plans will be provided with the staging fully coordinated with road construction and emergency vehicle considerations.

ACCESS MANAGEMENT – In addition to intersections, driveways/entrances deserve thoughtful solutions focus with regard to safety. The proposed design gives this proper attention within the concept plans through:

- Consolidation of driveways on Access Roads
- Control of Left-turns and U-turns at defined intersections (including Maryland "T" and J-Turns)
- New median

Key considerations for an effective access management design include sight distance appropriate for all movements, access controls that do not force exceedingly long trips and elimination of operational conflict of access roads and intersections (including J-Turn Loons).

Figure 2.09.02.4 Newark Rd North US 113



Note – Vehicles entering US 113 SB from Access Road F or Driveway G must travel 2-1/4 to 2-1/2 miles before reaching a J-Turn. AI/WM proposes a concept (similar to ATC #4) at Newark Road in order to introduce a U-Turn movement (See Figure 2.09.02.4) at a distance of 1 mile away from Access F; therefore reducing the trip distance by nearly 3 miles.

We have found that access road improvements are sensitive issues with regard to property owner interest and we will emphasize communication in design and during construction. Business operations will be observed and documented before and during construction in order to understand farm/business/residence access considerations. One-on-one meetings with our Construction Manager and individual property owners are certainly appropriate. Maintenance of driveway access requires constant dialogue with owners and minimization of impact.

RAILROAD CROSSING – The at-grade crossing with the MD-DE Railroad is located near Station 1552. While rail crossings are almost always challenging for design and construction, fortunately the AI/WM Team has positive experience and great resources in working through this element of the PROJECT.

Coordination – WM designed the at-grade rail crossing of US 113 near the Delaware Line on a prior SHA DB project. We called upon Frank Waesche and Ed Smith of WM – both former MTA Chief Engineers who have routinely worked with every private railroad in the state. We met with Mr. Eric Calloway (current President of MD-DE Railroad) in order to achieve consensus on design, sequencing and coordination. We will use the same approach and resources here on the US 113 (Phase 3) Project.

Skew Angle – The existing skew angle of the US 113 crossing is 20 degrees. The proposed skew angle is 28˚ which is a significant betterment over existing conditions.

Bicycle Crossing – There is specific guidance from SHA regarding bicycle compatibility at this crossing, as discussed herein. The bicycle path will be designed to be independent of the roadway shoulder and cross the railroad between 60 & 90 degrees.

Geometry – Based upon our experience near the Delaware Line, we recognize that the road horizontal alignment and profile must be carefully coordinated in order to integrate with the rail line since the railroad is not moving. Our experience is that only moderate "warping" of the section through this area is required – provided the profile is adequately designed.

Work Restrictions – We understand that the railroad will shut down operations between 9/8/2016 and 9/8/2017 so that road construction at the crossing can occur. We also understand that the railroad will need the final two months (7/8/2017 to 9/8/2017) in order to construct their crossing tie-ins and signal hardware. These limitations apply from Station 1548 to station 1553. AI/WM is fully prepared to accommodate this schedule.

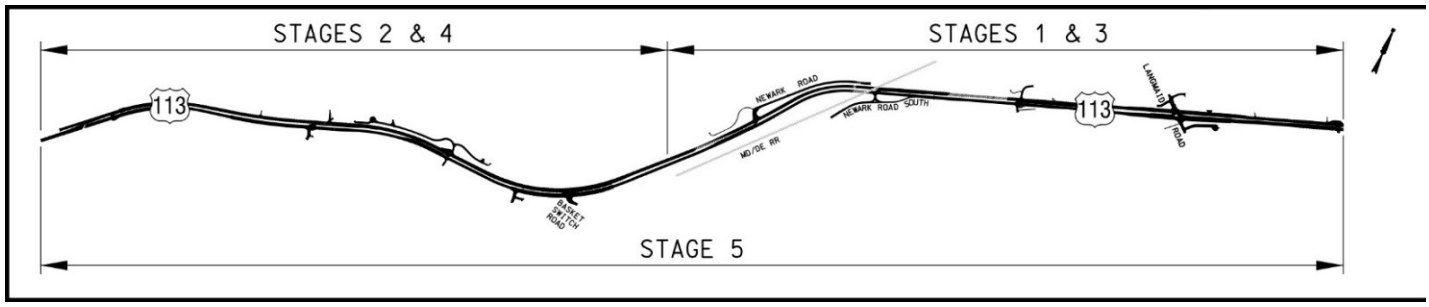
CONSTRUCTION SEQUENCING, METHODS AND INNOVATION

The AI/WM Team has studied the US 113 corridor and divided the PROJECT into two segments to accommodate phased R/W clearance, expedite utility relocations, adhere to FIDS restrictions, and minimize disruptions to the public. The PROJECT was divided at Station 1520, which is a logical divide that geographically splits the PROJECT into two segments and makes sense with respect to SWM solutions. Segmenting the 4 miles of project length into two areas approximately 2 miles in length minimizes disruption to local road users and through traffic and creates a manageable work zone length.

Segmenting the PROJECT into two sections gets shovels in the ground sooner exceeding the PROJECT's schedule timeframe.

CONSTRUCTION SEQUENCING – Given the high visibility of the PROJECT and historic safety considerations, the AI/WM Team has sequenced construction work in the minimum number stages while providing maximum safety to workers and the traveling public. The five stages of construction described below and shown in Figure 2.09.02.5 assist in accelerating critical path utility relocations during Stage 1 on the Northern end and Stage 2 on the Southern end, construct the roadway widening in Stages 3 and 4, and complete the PROJECT in Stage 5.

Figure 2.09.02.5 US 113 Construction Stages



Stage 1 – Clearing & Rough Grading Sta. 1520 North. Clearing North of Sta. 1520 will allow for the rough grading of US 113, Langmaid Road, Newark Road, Access Roads H to L, and Driveways H, S, U and V. Once the roadway grade is established, Small Structure No. 23070X0 roadway cross culvert at Sta. 1578+50 will be installed and utility relocation efforts will commence.

Stage 2 – Clearing & Rough Grading Sta. 1520 South. Clearing South of Sta. 1520 will allow for rough grading of US 113, Basket Switch Road, Access Roads B to F, and Driveways C to G, I and J. Once the roadway grade is established, utility relocation efforts will continue and installation of the Small Structure No. 23069X0 roadway cross culvert at Sta. 1481 will commence.

Stage 3 – Final Roadway Construction & Grading Sta. 1520 North. Construction will include the dualized US 113 roadways and connecting side roads/access drives North of Sta. 1520, and the demolition of the existing RR crossing and construction of the new crossing.

Stage 4 – Final Roadway Construction & Grading Sta. 1520 South. Continuing construction efforts of the dualized US 113 roadways and connecting side roads/access drives South of Sta. 1520.

Stage 5 – Project Completion and Acceptance. Construction work in this stage will include installation of intersection lighting, signing, landscaping, final roadway paving and markings, and the full opening of the US 113 dualized roadways.

METHODS – AI will self-perform the major work elements for the PROJECT with AI crews and will utilize our Bishop plant to supply asphalt for the paving operations, which provide both schedule control and flexibility. Subcontractors will be utilized to achieve the PROJECT's participation goals. We anticipate subcontracting trucking, clearing, electrical, signage, striping, landscaping, and erosion and sediment controls.

As discussed above and demonstrated by the schedule included in Section 2.09.03, the PROJECT has been divided based on phased ROW clearance and construction has been sequenced to expedite the critical path utility relocations. Generally, construction will progress from North to South and construction associated with the railroad crossing will be coordinated with the MD/DE Railroad and in accordance with the railroad embargo.

The AI/WM Team's sequencing of construction builds flexibility to accelerate the railroad crossing construction by at least 6 months and reduce the Railroad embargo time frame by 3 months, exceeding the project requirements.

The AI/WM Team will coordinate with local stakeholders, including emergency responders, with respect to traffic impacts associated with construction of the PROJECT. In order to minimize disruptions to traffic, our approach will build as much of the roadway widening as possible from the existing roadway. This includes the dual section of pavement where the new pavement is "offline", culvert extensions, and "external" SWM facilities. We will coordinate clearance of utilities early to maximize available work space and safety. Culvert extensions will be constructed early, subject to time of year restrictions, in order to prepare for roadwork in future phases.

Maintenance of Traffic – A comprehensive Transportation Management Plan (TMP) will be compiled at the beginning of the PROJECT and will include the sequence of construction, operation of the intersections at each stage, and supporting studies necessary to prove that intersection operations are maintained at existing levels of service. Plans will be developed indicating all temporary flagging, signs, arrow boards, VMS boards, lighting, traffic signals, barricades, and channelization devices to maintain traffic through the work area.

Traffic Engineer, Matt Allen, and Construction Traffic Manager, Alvin Straufer, will work closely to ensure the traffic plans reflect construction means and methods and are implemented properly in the field. Traffic will be continuously maintained along US 113 and connecting side roads at all times. Peak traffic periods will be identified and work will be maximized during reduced traffic periods to improve safety and optimize efficiency.

During Stage 1 and Stage 2, traffic will utilize the existing roadways and existing traffic operations will be maintained. During Stage 3, traffic will primarily utilize the existing roadways. However, once the railroad embargo goes into effect, US 113 traffic will utilize the temporary road widening to the East through the RR crossing to allow for complete demolition of the existing RR crossing and construction of the new crossing. Temporary Crossovers will be utilized to shift traffic from the old road onto the new road and will be constructed in accordance with AASHTO, MUTCD, and SHA standards to safely accommodate all vehicle types and traffic travelling within the corridor. During Stage 4, traffic will primarily utilize the existing roadway network through the project limits and existing traffic movements and patterns will be maintained. Stage 5 will include the implementation and integration of the final new intersections and then full opening of the US 113 dualized roadway.

Construction Access and Staging – Construction entrances will be developed to ensure safe access and egress to/from all to work areas, staging areas, and lay down yards. When possible, hauling vehicles will utilize the newly constructed roadway within the work area to avoid impacting traffic. Staging areas will be located within the work zone in the existing right of way limits. A construction yard will be established in close proximity to the PROJECT site to minimize the need for haul material and equipment on public roads after its initial delivery to the PROJECT. Designated personnel will coordinate with suppliers for materials deliveries to ensure drivers are aware of the exact delivery points to avoid spending unnecessary time on the arterial roadways surrounding the PROJECT.

INNOVATION – AI's Production System approach to construction is focused on continuous improvement and utilization of innovative construction means & methods and is further described in the Construction Management

narrative in Section 2.09.03. Our focus on innovative construction means & method will be continuously evaluated as the PROJECT progresses into the design phase. *The following construction innovations identified at this point and incorporated into our proposal accelerate construction the construction schedule but also reduce costs:*

- ***Warm-Mix Asphalt*** – Utilizing newer technology for warm mix asphalt lowers the temperature at which asphalt is produced, produces mixes at a better price, and minimize environmental impacts since the production consumes less energy and reduces emissions.
- ***Soil Cement*** – Utilizing soil cement within the pavement section reduces the asphalt section, which reduces the construction schedule while providing the 25 year life-span. The pavement section provided in the RFP include two lifts of capping borrow and four lifts of asphalt pavement. The revised pavement section approved as part of ATC #1 includes two lifts of capping borrow, placement of soils cement, one lift of GAB aggregate, and three lifts of asphalt.
- ***Normal Crown Typical Section*** – Utilizing a typical section that separately crowns US 113 Northbound and Southbound to slope away from the center of each roadway rapidly drains the pavement during a rainstorm which improves safety, reduces the project footprint, and does not require a wedge/level course for overlaying the existing roadway.
- ***Small Structure Culvert Construction*** – Replacing the existing small structure culverts at Sta. 1481 with a 72" concrete pipe and dual 60" pipes at Sta. 1578 eliminates the need for concrete foundation elements (i.e. piling foundation for a box culvert) and therefore minimizes the required in-stream work durations, benefitting both the construction schedule and the environment.
- ***Shifting the Southern Project Limit*** – Shifting the Southern tie-in limit of new dualized road to the existing 2-lane road approximately 400 feet to the North avoids construction impacts to extend the existing box culvert at approx. Sta. 1427 in this phase of work, which will ultimately be impacted again by Phase 4 of the US 113 Corridor Improvements. The benefits include reduced environmental impacts as well as schedule/cost savings to construct the permanent configuration and avoid interim impacts.
- ***Safety Culture*** – Utilizing AI's *Home Safe Tonight* safety program, which is focused on accident and incident prevention to achieve zero incidents/injuries, benefits the travelling public, construction crews, subcontractors/suppliers, and ultimately the SHA.

MAINTENANCE BENEFITS

The AI/WM Team will approach the PROJECT with a big picture of integrated design, construction and maintenance and will utilize lessons learned from our experience working in the PROJECT area. Our team members have completed three design and six construction projects along US 113, and a total of five highway design and thirteen multi-lane divided highway paving projects nearby. In addition, AI's Bishop Asphalt plant is located just 12 miles from the PROJECT. This experience and our understanding of the unique challenges of the project corridor have provided an appreciation of the following key maintenance issues that have life cycle implications.

SWM – Stormwater management is required for all new and reconstructed impervious areas on the PROJECT, approximately 35 acres. The Concept SWM Report primarily proposes grass swales and submerged gravel wetlands, with a few infiltration berms in order to meet the water quality and quantity requirements. Stormwater management will be implemented uniformly across the PROJECT site to mimic existing hydrologic conditions rather than in end of line facilities. The AI/WM Team proposes to phase construction for separate areas of the PROJECT. Each phase of construction will include the required SWM design for that section. In that way, the SWM permit can be obtained for each construction phase prior to construction. SWM can be streamlined by utilizing ESD facilities within the roadside ditches. These types of facilities are easier to maintain and look more natural in the roadway environment. The driving design factor in choosing the proper ESD facilities for this PROJECT are the existing soil conditions, including water table and hydrologic soil type. In areas of high

groundwater, wet swales are permissible. AI/WM will take advantage of wet swales wherever feasible on the PROJECT site. A wet swale, or other SWM facilities, may be utilized in the median where the edge of pavement of the dualized roadway is close in elevation. By utilizing the roadway median, fewer facilities would be required outside of the roadway, thereby minimizing the PROJECT footprint.

Utilizing Wet Swales reduces maintenance by requiring only mowing as opposed to periodic replacement of filtering media for Bio-Swales.

GEOTECHNICAL – A strong appreciation of corridor geotechnical elements is critical for delivery of a durable and low-maintenance project whose performance exceeds expectations. AI and WM's experience on the Eastern Shore (and US 113 corridor in particular) is therefore highly valuable. We recognize that the corridor is sited in the coastal plain province which is typically characterized by fine and coarse grain soil deposits. This information is corroborated by the RFP provided laboratory data showing that the predominant soils consist of sands and silty sands. It is also evident based on some of the existing boring information that the groundwater table may play a role in the design of the geotechnical features for this PROJECT. One of the objectives of the supplemental subsurface investigation our Team will complete will be narrowing down the areas and depths of the water table. No global slope stability or long-term settlement issues are anticipated, but these characteristics will be analyzed and assessed during the geotechnical evaluation. Typical issues found in the area include erosion at pipe outfalls and slope failure.

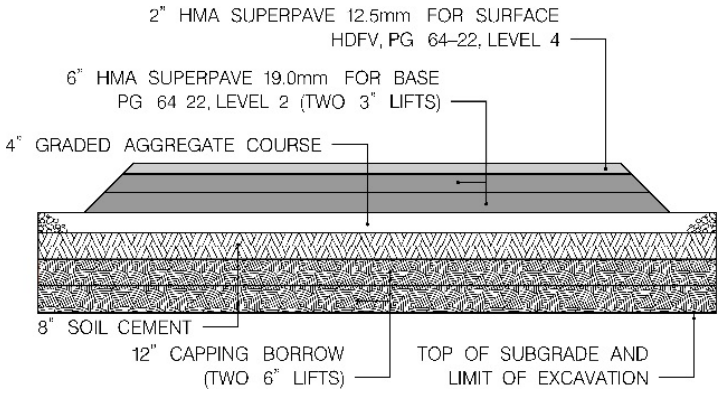
Erosion / Pipe Outfalls – Given the presence of water combined with natural sandy soil conditions on the Eastern Shore, erosion is often present. Washouts are a common problem faced by SHA District 1 Maintenance forces. The AI/WM Team will take preventative measures in design and construction in order to deliver the best product with regard to maintenance. *For example, pipe systems and cross-culvert will be designed to be relatively flat as conditions allow. Stabilization will be installed at outfalls to be consistent with anticipated maximum velocities.*

Typical Sections / Fill Slopes – As mentioned previously, our Team will construct relatively flat fill slopes where feasible in the interest of safety and elimination of metal barrier and also to facilitate any future maintenance work. However, the added benefit in doing so rests with the availability of Right-of-Way. If steeper slopes are required, we will analyze the conditions and select the best option for engineered slopes such as Reinforced Stabilized Slopes. New slope construction against existing embankments will be benched per the MDSHA Standard Specifications for Construction and Materials. Additionally, District 1 has often been challenged with surficial or sloughing failures on 2:1 (and even flatter) slopes. *Crowning of the NB and the SB roadways independently prevents approximately 316,000 SF of runoff from draining to the outside shoulders*

Maximum fill slopes of 4:1 will be utilized to the greatest extent possible and geotextile and soil stabilization matting will be used as necessary to minimize sloughing.

PAVEMENT DESIGN – The AI/WM Team provides a comprehensive approach to pavement engineering. Our familiarity with the SHA pavement design procedures allows us to recommend cost-effective pavement sections that consider design parameters as well as existing conditions, material selection, construction methods, future rehabilitation activities, and overall service life. With this, the AI/WM Team considers both the PROJECT and network-level perspective during the pavement design process.

Figure 2.09.02.6 ATC #1 Pavement Alternative



The existing pavement on US 113 is a combination of flexible and composite pavement. Pavement distresses observed in this section of US 113 include some longitudinal and transverse cracking (environmentally induced cracking). The existing pavement also shows some reflective cracking due to the movement of the existing slabs of the jointed reinforced concrete pavement.

Based on the elements and conditions described above, the AI/WM Team submitted ATC #1 (See Figure 2.09.02.6) for which savings are achieved by reducing the thickness of the Hot-Mix Asphalt base using the desired input parameters listed in the 2006 MDSHA Pavement Design Guide without hindering the essential functions, characteristics, or expected performance of the PROJECT. Our Team will make certain that all pavement elements including the rehabilitation sections meet or exceed the performance criteria in terms of structural capacity, skid resistance, visual appearance and ride quality in accordance to TC 3.10.

The proposed pavement design exceeds the structural capacity provided by the RFP pavement section.

VALUE ADDED TO THE PROJECT ABOVE THE MINIMUM PROJECT SCOPE

The AI/WM Team approaches every project with a desire to exceed the Owner's expectations. We spend significant energy seeking to implement solutions which provide benefit to the project while achieving project goals and scope. These concepts, solutions and betterments provide added value to the PROJECT, our clients, and ultimately the public who will utilize the facilities we design and construct.

The ATCs as developed and approved by SHA will be implemented and offer clear value to the PROJECT. These ATC's are discussed throughout this narrative and a summary of the value-added by these concepts is provided below. Additional considerations that add value to the PROJECT include the AI/WM Team's approach to the design and construction of specific work elements as well as our Team's approach to coordination and collaboration with SHA and project stakeholders. A summary of the benefits the AI/WM Team provides compared to the PROJECT's goals is provided in Table 2.09.02.1.

A) Alternative Pavements Section (ATC #1) – This ATC reduces the thickness of the pavement without hindering the essential functions, characteristics, or expected performance – and associated economic benefit. The result is a more durable and maintainable facility.

B) Southbound Lane Drop & Southbound Roadway Crossover (ATC #2) – This ATC reduces stream impacts at the southern limit of work. A secondary benefit is minimized impacts to FIDS habitats.

C) Bicycle Pocket Lane Prior to a Right Turn Lane (ATC #3) – This ATC improves safety for motorists and bicyclists through implementation of a bicycle compliant design and enhances corridor safety and mobility.

D) Turning Movements at Newark Road South / US 113 (ATC #4) – This ATC provides operational and safety improvements at the Newark Road South intersection (as illustrated under Corridor Safety & Operations). The results offer benefit in corridor safety and mobility.

E) Emergency Crossovers – Through our discussion on Emergency Response, we have provided a preliminary recommendation regarding locations and treatments that provide access for emergency vehicles. Also, we have committed to delivering on a study to assess response time. These elements improve corridor safety/mobility and safety/access for Emergency Response.

F) Normal Crown on Existing Section / Cross Slope to Drain to Edges – Crowning the Northbound and Southbound roadways independently

Table 2.09.02.1 Value Added Project Elements

PROJECT GOALS	A	B	C	D	E	F	G	H	I	J	K	L
Corridor-Wide Safety & Mobility		■	■	■	■	■	■	■			■	■
Effective Access Management					■							■
Safety & Access for Emergency Response		■			■							■
Durable & Maintenance Facility	■					■	■	■	■	■	■	■
RR Crossing Constructed on Schedule											■	■
Minimized Environmental/FIDS Impacts		■					■	■	■	■	■	■
Schedule Benefit	■								■		■	■
Economic Benefit	■			■		■	■	■	■		■	■

eliminates a wedge & leveling course and provides associated economic benefits. In addition, this benefits corridor safety & mobility as stormwater runoff is effectively collected and removed from the pavement surface.

G) Profile Adjustment – As referenced, we are observing locations where 2-3 feet differential on existing pavement is the resultant differential. The final profile will seek to minimize impacts and borrow requirements and provide associated economic benefits. The reduced profile minimizes fill slopes (which diminishes environmental impact) and also eliminates the need for roadside traffic barrier in certain locations (providing less infrastructure to maintain). The end result is minimized impact on FIDS, improved corridor safety and mobility, and a more durable and maintainable facility.

H) Pipe Replacement vs. Extension – Several existing crossings will be replaced entirely rather than extended, which results in a more durable and maintainable facility.

I) Installation of Pipes vs. Box Culverts – We have evaluated the proposed replacement of the existing box culvert at Sta. 1481 and determined that dual 60“ pipes are an adequate replacement from the standpoint of H&H and structural simplicity with the elimination of reinforced concrete foundation elements for the pipe installation. The crossing will require less inspection and maintenance in future years, providing a durable and maintainable facility.

J) Fill Slope Flattening to 4:1 – Where possible, we will seek to flatten fill slopes to 4:1 and provide a 30 ft. clear zone in order to eliminate roadside W Beam traffic barrier (providing less infrastructure to maintain). In addition, we will further evaluate the need of dual roadside ditches, with one providing roadway collection/SWM and the other collecting off-site drainage. With eliminating the second off-site drainage collection ditch, the PROJECT footprint will be reduced and associated environmental impacts diminished. The result is minimized impact on FIDS, improved corridor safety and mobility, and a more durable and maintainable facility.

K) Experience in Design – The AI/WM Team is intimately familiar with the PROJECT corridor in light of our relevant US 113 corridor experience. In addition, we have been involved in various projects with J-Turns and Maryland “T” solutions. This experience provides value added relative to all project goals.

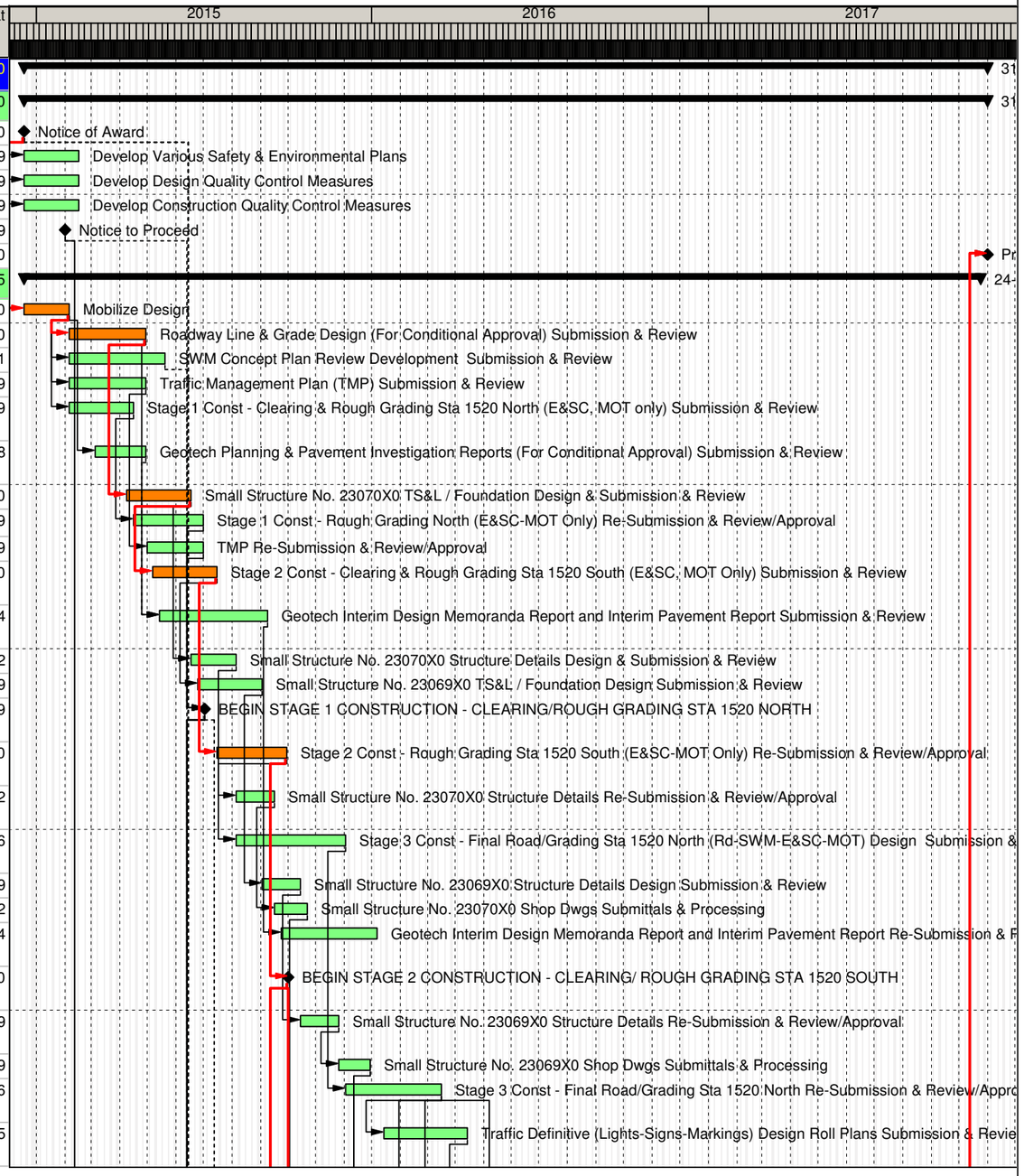
L) Communication – The AI/WM Team has strong communication skills and coordination expertise based on our experience with the project stakeholders and design-build delivery. Our Team provides the following liaison’s to facilitate coordination efforts:

- *Liaison with the Railroad* – The resources of Ed Smith and Frank Waesche (former MTA Chief Engineers) serving as liaison with the railroad was extremely beneficial in the Jarvis Road to Delaware Line project. This experience provides a higher likelihood that the railroad crossing is constructed on schedule.
- *Liaison with Emergency Response* – We believe that naming a Professional Fire Fighter to serve as the lead in communicating with local emergency response agencies is a great benefit to the PROJECT. AI’s Gus Everhart will serve in this role and coordinate emergency response to ensure safety and mobility.
- *Liaison with Utilities* – Bill Wallace (WM) and Rick Tisa (AI) will serve in the coordination roles for design and construction respectively. Both have recent relevant experience in clearing utilities on major transportation projects which will facilitate on-schedule utility relocations.
- *Liaison with Environmental Agencies* – Jessica Klinefelter (WM) and Neph Eyassu (AI) will serve in the coordination roles for design and construction. Both have recent relevant experience in environmental compliance on major transportation projects and will ensure compliance with permit conditions and minimization of environmental impacts through innovative design and construction techniques.
- *Liaison with C.R.A.S.H. and Local Stakeholders* – WM’s involvement in the design of various projects along the US 113 corridor results in an understanding of the perspective of CRASH (County Residents Action for Safer Highways). The AI/WM Team will work closely with Linda Moreland (Remline) to assure that CRASH and all stakeholders are engaged in the PROJECT and their concerns are adequately addressed.

2.09.03
Project Schedule and Project Management

US 113 (PHASE 3) FROM NORTH OF MASSEY BRANCH TO FIVE MILE BRANCH ROAD

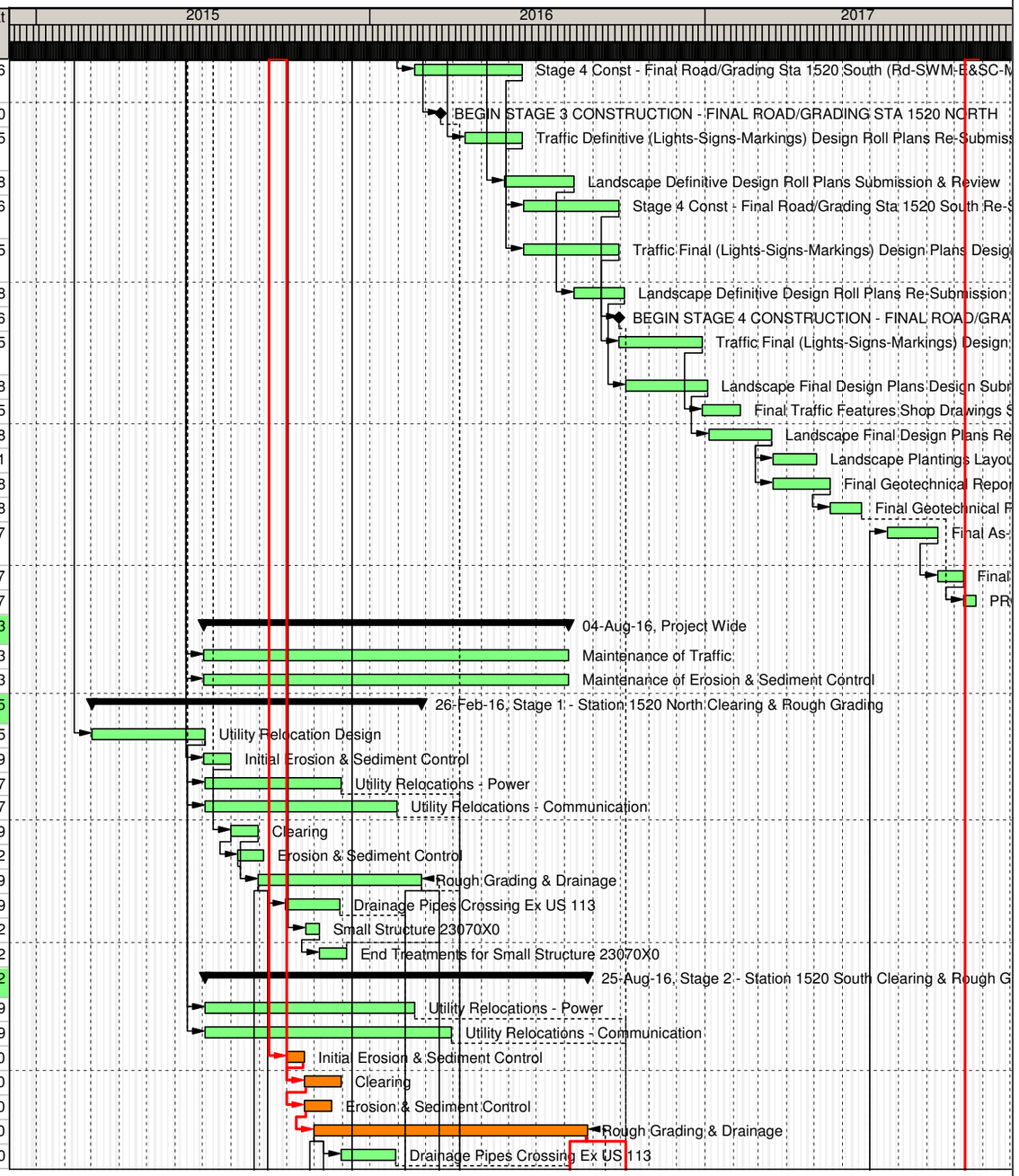
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
WO6365170 US 113 (Phase 3) -North of Massey Branch to Five Mile...		743	18-Dec-14	31-Oct-17	0
Contract Administration & Management		743	18-Dec-14	31-Oct-17	0
A00010	Notice of Award	0	18-Dec-14*		0
A00020	Develop Various Safety & Environmental Plans	60	18-Dec-14	15-Feb-15	989
A00030	Develop Design Quality Control Measures	60	18-Dec-14	15-Feb-15	989
A00040	Develop Construction Quality Control Measures	60	18-Dec-14	15-Feb-15	989
A00100	Notice to Proceed	0	01-Feb-15*		149
A00200	Project Completion	0		31-Oct-17	0
Design		738	18-Dec-14	24-Oct-17	5
B00010	Mobilize Design	49	18-Dec-14	04-Feb-15	0
B00020	Roadway Line & Grade Design (For Conditional Approval) Submission & Review	84	05-Feb-15	29-Apr-15	0
B00060	SWM Concept Plan Review Development Submission & Review	105	05-Feb-15	20-May-15	101
B00080	Traffic Management Plan (TMP) Submission & Review	84	05-Feb-15	29-Apr-15	59
B00120	Stage 1 Const - Clearing & Rough Grading Sta 1520 North (E&SC, MOT only) Submission & Review	70	05-Feb-15	15-Apr-15	59
B00030	Geotech Planning & Pavement Investigation Reports (For Conditional Approval) Submission & Review	56	05-Mar-15	29-Apr-15	678
B00170	Small Structure No. 23070X0 TS&L / Foundation Design & Submission & Review	70	09-Apr-15	17-Jun-15	0
B00140	Stage 1 Const - Rough Grading North (E&SC-MOT Only) Re-Submission & Revie...	77	16-Apr-15	01-Jul-15	59
B00100	TMP Re-Submission & Review/Approval	63	30-Apr-15	01-Jul-15	59
B00240	Stage 2 Const - Clearing & Rough Grading Sta 1520 South (E&SC, MOT Only) Submission & Review	70	07-May-15	15-Jul-15	0
B00360	Geotech Interim Design Memoranda Report and Interim Pavement Report Submission & Review	119	14-May-15	09-Sep-15	664
B00190	Small Structure No. 23070X0 Structure Details Design & Submission & Review	49	18-Jun-15	05-Aug-15	142
B00290	Small Structure No. 23069X0 TS&L / Foundation Design Submission & Review	70	25-Jun-15	02-Sep-15	179
B00160	BEGIN STAGE 1 CONSTRUCTION - CLEARING/ROUGH GRADING STA 1520 NORTH	0	02-Jul-15		59
B00260	Stage 2 Const - Rough Grading Sta 1520 South (E&SC-MOT Only) Re-Submission & Review/Approval	77	16-Jul-15	30-Sep-15	0
B00210	Small Structure No. 23070X0 Structure Details Re-Submission & Review/Approval	42	06-Aug-15	16-Sep-15	142
B00400	Stage 3 Const - Final Road/Grading Sta 1520 North (Rd-SWM-E&SC-MOT) Design Submission & Review	119	06-Aug-15	02-Dec-15	26
B00310	Small Structure No. 23069X0 Structure Details Design Submission & Review	42	03-Sep-15	14-Oct-15	179
B00230	Small Structure No. 23070X0 Shop Dwgs Submittals & Processing	35	17-Sep-15	21-Oct-15	142
B00380	Geotech Interim Design Memoranda Report and Interim Pavement Report Re-Submission & Review/Approval	105	24-Sep-15	06-Jan-16	664
B00280	BEGIN STAGE 2 CONSTRUCTION - CLEARING/ ROUGH GRADING STA 1520 SOUTH	0	01-Oct-15		0
B00330	Small Structure No. 23069X0 Structure Details Re-Submission & Review/Approval	42	15-Oct-15	25-Nov-15	179
B00350	Small Structure No. 23069X0 Shop Dwgs Submittals & Processing	35	26-Nov-15	30-Dec-15	179
B00420	Stage 3 Const - Final Road/Grading Sta 1520 North Re-Submission & Review/Approval	105	03-Dec-15	16-Mar-16	26
B00450	Traffic Definitive (Lights-Signs-Markings) Design Roll Plans Submission & Review	91	14-Jan-16	13-Apr-16	265



Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

US 113 (PHASE 3) FROM NORTH OF MASSEY BRANCH TO FIVE MILE BRANCH ROAD

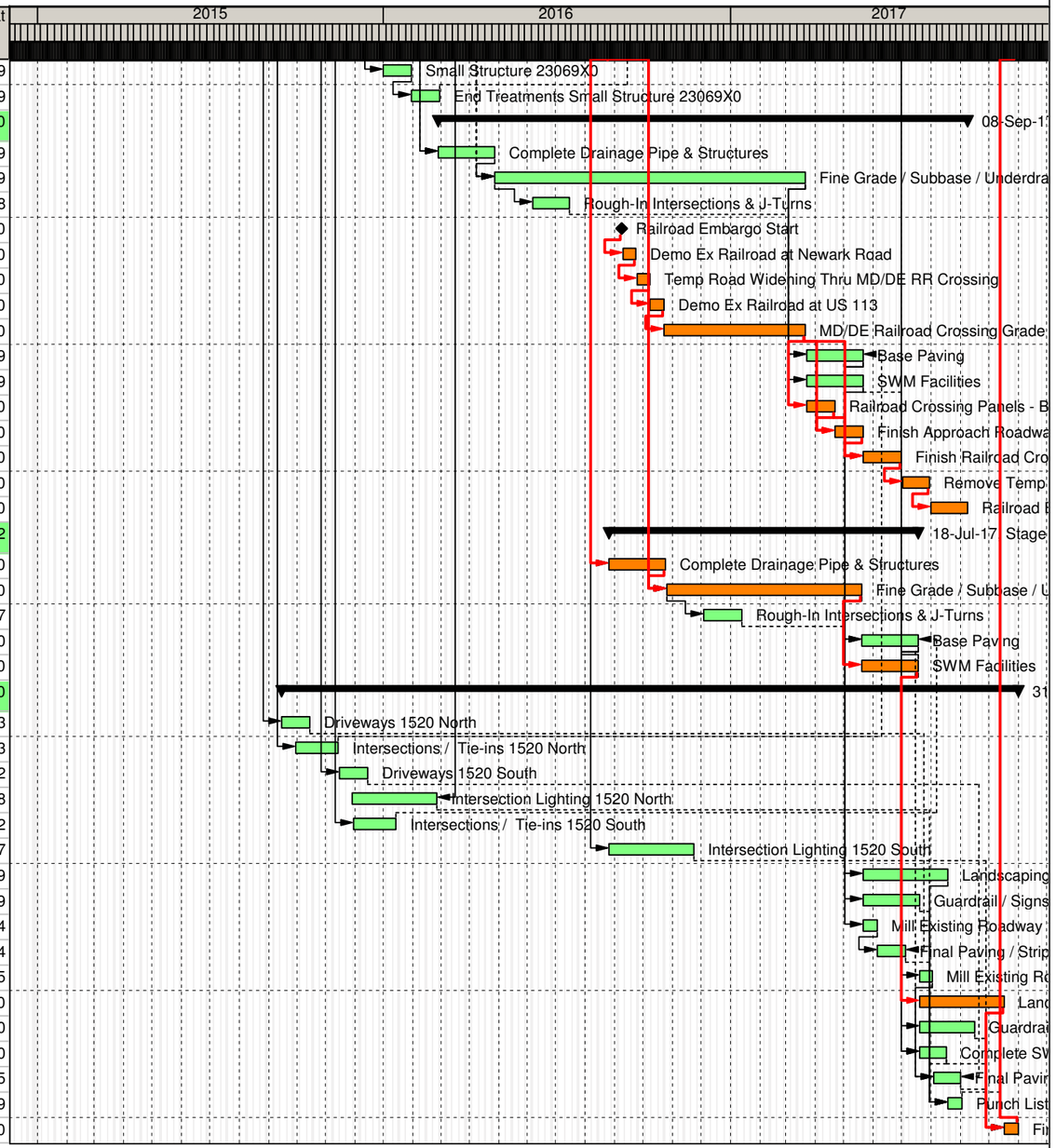
Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
B00490	Stage 4 Const - Final Road/Grading Sta 1520 South (Rd-SWM-E&SC-MOT) Design Submission & Review	119	18-Feb-16	15-Jun-16	26
B00440	BEGIN STAGE 3 CONSTRUCTION - FINAL ROAD/GRADING STA 1520 NORTH	0	17-Mar-16		100
B00470	Traffic Definitive (Lights-Signs-Markings) Design Roll Plans Re-Submission & Review/Approval	63	14-Apr-16	15-Jun-16	265
B00590	Landscape Definitive Design Roll Plans Submission & Review	77	26-May-16	10-Aug-16	118
B00510	Stage 4 Const - Final Road/Grading Sta 1520 South Re-Submission & Review/Approval	105	16-Jun-16	28-Sep-16	26
B00540	Traffic Final (Lights-Signs-Markings) Design Plans Design Submission & Review	105	16-Jun-16	28-Sep-16	265
B00610	Landscape Definitive Design Roll Plans Re-Submission & Review/Approval	56	11-Aug-16	05-Oct-16	118
B00530	BEGIN STAGE 4 CONSTRUCTION - FINAL ROAD/GRADING 1520 SOUTH	0	29-Sep-16		26
B00560	Traffic Final (Lights-Signs-Markings) Design Plans Re-Submission & Review/Approval	91	29-Sep-16	28-Dec-16	265
B00630	Landscape Final Design Plans Design Submission & Review	91	06-Oct-16	04-Jan-17	118
B00580	Final Traffic Features Shop Drawings Submittals & Processing	42	29-Dec-16	08-Feb-17	265
B00650	Landscape Final Design Plans Re-Submission & Review/Approval	70	05-Jan-17	15-Mar-17	118
B00670	Landscape Plantings Layout/Materials Submittals & Processing	49	16-Mar-17	03-May-17	181
B00680	Final Geotechnical Report Submission & Review	63	16-Mar-17	17-May-17	118
B00700	Final Geotechnical Report Re-Submission & Review/Approval	35	18-May-17	21-Jun-17	118
B00720	Final As-Built Plans Submission & Review	56	19-Jul-17	12-Sep-17	7
B00740	Final As-Built Plans Re-Submission & Review/Approval	28	13-Sep-17	10-Oct-17	7
B00760	PROJECT COMPLETION	14	11-Oct-17	24-Oct-17	7
Project Wide		286	02-Jul-15	04-Aug-16	323
H00010	Maintenance of Traffic	400	02-Jul-15	04-Aug-16	453
H00020	Maintenance of Erosion & Sediment Control	400	02-Jul-15	04-Aug-16	453
Stage 1 - Station 1520 North Clearing & Rough Grading		260	02-Mar-15	26-Feb-16	85
B00025	Utility Relocation Design	90	02-Mar-15	03-Jul-15	105
C00080	Initial Erosion & Sediment Control	30	02-Jul-15	31-Jul-15	59
C00050	Utility Relocations - Power	150	03-Jul-15	30-Nov-15	207
C00060	Utility Relocations - Communication	210	03-Jul-15	29-Jan-16	147
C00010	Clearing	30	01-Aug-15	30-Aug-15	59
C00020	Erosion & Sediment Control	30	08-Aug-15	06-Sep-15	72
C00030	Rough Grading & Drainage	180	31-Aug-15	26-Feb-16	59
C00070	Drainage Pipes Crossing Ex US 113	60	30-Sep-15	28-Nov-15	149
C00040	Small Structure 23070X0	15	22-Oct-15	05-Nov-15	142
C00090	End Treatments for Small Structure 23070X0	30	06-Nov-15	05-Dec-15	142
Stage 2 - Station 1520 South Clearing & Rough Grading		299	03-Jul-15	25-Aug-16	42
D00050	Utility Relocations - Power	230	03-Jul-15	18-Feb-16	249
D00060	Utility Relocations - Communication	270	03-Jul-15	29-Mar-16	209
D00080	Initial Erosion & Sediment Control	20	01-Oct-15	20-Oct-15	0
D00010	Clearing	40	21-Oct-15	29-Nov-15	0
D00020	Erosion & Sediment Control	30	21-Oct-15	19-Nov-15	0
D00030	Rough Grading & Drainage	300	31-Oct-15	25-Aug-16	0
D00070	Drainage Pipes Crossing Ex US 113	60	30-Nov-15	28-Jan-16	210



Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

US 113 (PHASE 3) FROM NORTH OF MASSEY BRANCH TO FIVE MILE BRANCH ROAD

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float
D00040	Small Structure 23069X0	30	31-Dec-15	29-Jan-16	179
D00090	End Treatments Small Structure 23069X0	30	30-Jan-16	28-Feb-16	179
Stage 3 Final Grading & Roadway Construction Sta 1520 North		400	27-Feb-16	08-Sep-17	0
E00070	Complete Drainage Pipe & Structures	60	27-Feb-16	26-Apr-16	59
E00010	Fine Grade / Subbase / Underdrain	329	27-Apr-16	21-Mar-17	59
E00060	Rough-In Intersections & J-Turns	40	06-Jun-16	15-Jul-16	338
E00090	Railroad Embargo Start	0	08-Sep-16*		0
E00080	Demo Ex Railroad at Newark Road	15	09-Sep-16	23-Sep-16	0
E00030	Temp Road Widening Thru MD/DE RR Crossing	14	24-Sep-16	07-Oct-16	0
E00035	Demo Ex Railroad at US 113	15	08-Oct-16	22-Oct-16	0
E00040	MD/DE Railroad Crossing Grade /Subbase / Conduit / Base	150	23-Oct-16	21-Mar-17	0
E00020	Base Paving	60	22-Mar-17	20-May-17	89
E00050	SWM Facilities	60	22-Mar-17	20-May-17	59
E00045	Railroad Crossing Panels - By Others	30	22-Mar-17	20-Apr-17	0
E00120	Finish Approach Roadways at Railroad Crossing	30	21-Apr-17	20-May-17	0
E00100	Finish Railroad Crossing	41	21-May-17	30-Jun-17	0
E00130	Remove Temp Widening at MD/DE RR Crossing	30	01-Jul-17	30-Jul-17	0
E00110	Railroad Embargo Finish	40	31-Jul-17	08-Sep-17*	0
Stage 4 Final Grading & Roadway Construction Sta 1520 South		233	26-Aug-16	18-Jul-17	22
F00050	Complete Drainage Pipe & Structures	60	26-Aug-16	24-Oct-16	0
F00010	Fine Grade / Subbase / Underdrain	207	25-Oct-16	19-May-17	0
F00040	Rough-In Intersections & J-Turns	40	04-Dec-16	12-Jan-17	157
F00020	Base Paving	60	20-May-17	18-Jul-17	30
F00030	SWM Facilities	60	20-May-17	18-Jul-17	0
Stage 5 Project Completion		556	15-Sep-15	31-Oct-17	0
G00150	Driveways 1520 North	30	15-Sep-15	14-Oct-15	733
G00110	Intersections / Tie-ins 1520 North	45	30-Sep-15	13-Nov-15	643
G00160	Driveways 1520 South	30	15-Nov-15	14-Dec-15	672
G00010	Intersection Lighting 1520 North	90	29-Nov-15	26-Feb-16	598
G00120	Intersections / Tie-ins 1520 South	45	30-Nov-15	13-Jan-16	582
G00080	Intersection Lighting 1520 South	90	26-Aug-16	23-Nov-16	327
G00020	Landscaping & Reforestation 1520 North	90	21-May-17	18-Aug-17	59
G00040	Guardrail / Signs 1520 North	60	21-May-17	19-Jul-17	89
G00050	Mill Existing Roadway 1520 North (Tie-Ins)	15	21-May-17	04-Jun-17	104
G00030	Final Paving / Striping 1520 North	30	05-Jun-17	04-Jul-17	104
G00060	Mill Existing Roadway 1520 South (Tie-Ins)	15	19-Jul-17	02-Aug-17	45
G00070	Landscaping & Reforestation 1520 South	90	19-Jul-17	16-Oct-17	0
G00090	Guardrail / Signs 1520 South	60	19-Jul-17	16-Sep-17	30
G00170	Complete SWM Facilities Entire Project	30	19-Jul-17	17-Aug-17	60
G00100	Final Paving / Striping 1520 South	30	03-Aug-17	01-Sep-17	45
G00130	Punch List / Final Clean Up 1520 North	15	19-Aug-17	02-Sep-17	59
G00140	Final Punch List / Clean Up 1520 South	15	17-Oct-17	31-Oct-17	0



Actual Work | Remaining Work | Critical Remaining Work | Milestone | Summary

2.09.03 A. PROJECT SCHEDULE

METHODS TO ACHIEVE PROPOSED SCHEDULE

The AI/WM Team will implement a comprehensive "rolling" design and construction plan process to efficiently order materials, mobilize work forces, and construct the PROJECT in accordance with the RFP and the above noted requirements. The contract schedule and construction phasing will be driven by the requirements of:

- Clearing of R/W proceeding in a phased manner from North to South;
- Relocation of existing corridor utility facilities;
- Restricted work within Waters of US from March 1 to June 15 (Small Structure Nos. 23069X0 & 23070X0);
- Restricted clearing of forest stands south of Sta. 1509 from May 1 to August 31;
- Removing the existing railroad (RR) crossings at US 113 and Newark Road and then completing, in conjunction with the MD/DE RR, a new crossing of the US 113 dualized roadways by July 1, 2017;
- Maintaining the existing US 113 traffic movements and access points to US 113 for the duration of the PROJECT or until the proper integration of the proposed intersections and consolidation of access points;
- Maintaining existing and/or new established road and roadside drainage facilities; and
- Minimizing (forest) impacts to and protection of environmental resources.

SCHEDULE EXPLANATION – The preliminary CPM schedule divides the PROJECT into the Design & Approvals process and then Construction, which splits the site in half at the approximate division line of Sta. 1520. The sequencing follows the staging of clearing/rough grading the North section followed by the South section, and then similarly the final construction of the proposed roadway's North section followed by the South section.

BENEFITS OF AI/WM SEQUENCING OF THE PROJECT
1) Maximizes usage of the 2015 Spring/Summer construction season in conjunction with the phased R/W and unrestricted forest clearing North of Sta. 1509 for clearing and rough grading.
2) Provides the 2015-2016 Fall/Winter/Spring for significant advancement of the utility relocations with minimal conflict with ongoing roadway construction.
3) Mobilizes final roadway construction in Spring 2016 preceding from North to South and reaching the RR crossing by the embargo's start date of September 8, 2016 which provides the full embargo window.
4) Constructs the new US 113 railroad crossing's base materials for installing the crossing system by March 21, 2017 and completes the roadway at the crossing by May 20, 2017; prior to the July 1, 2017 milestone.
5) Provides a completion date of October 31, 2017; 1 month earlier than the RFP's completion date of November 30, 2017.

Based on our review of the RFP Documents and preliminary concept design efforts, our construction and traffic control sequencing for the PROJECT will consist of the following:

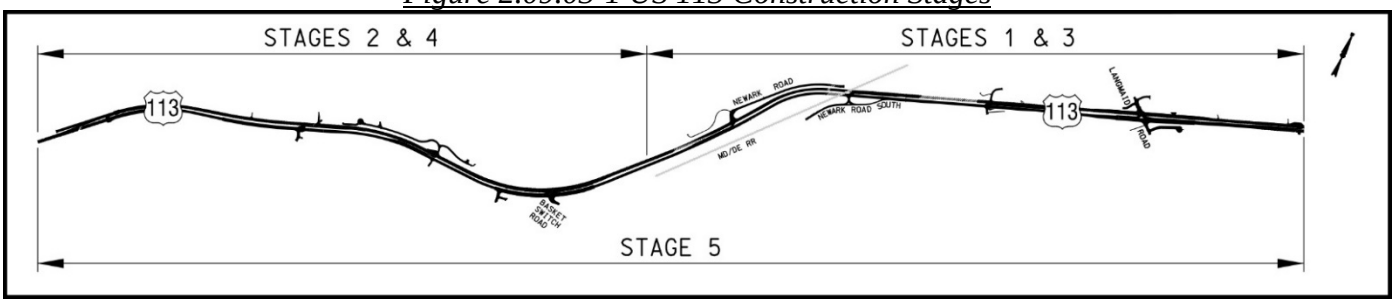
Stage 1 – Clearing & Rough Grading Sta. 1520 North. Within this phase, traffic will utilize the existing roadways and maintain their traffic operations. Clearing North of Sta. 1520 will allow for the rough grading of US 113, Langmaid Road, Newark Road, Access Roads H to L, and Driveways H, S, U & V. Once the roadway grade is established, Small Structure No. 23070X0 roadway cross culvert at Sta. 1578+50 will be installed and utility relocation efforts will commence. Design submittals for Stage 1 construction work consist of:

- Preliminary design submissions of the Roadway Line & Grade, Geotechnical Planning & Pavement Investigation Reports, SWM Concept Plan Review, and Traffic Management Plan (TMP);
- Stage 1 Construction – Rough Grading (E&SC and MOT Only) Sta. 1520 North Submission; and
- Small Structure No. 23070X0 TS&L/Foundation and Structures Details Review Submissions.

Stage 2 – Clearing & Rough Grading Sta. 1520 South. Within this phase, traffic will utilize the existing roadways and existing traffic operations will be maintained. Clearing South of Sta. 1520 will allow for rough grading of US 113, Basketswitch Road, Access Roads B to F, and Driveways C to G, I and J. Once the roadway grade is established, utility relocation efforts will continue and installation of the Small Structure No. 23069X0 roadway cross culvert at Sta. 1481 will commence. Design submittals for Stage 2 construction work will consist of:

- Stage 2 Construction – Rough Grading (E&SC and MOT Only) Sta. 1520 South Submission; and
- Small Structure No. 23069X0 TS&L/Foundation and Structures Details Review Submissions.

Figure 2.09.03-1 US 113 Construction Stages



Stage 3 – Final Roadway Construction & Grading Sta. 1520 North. Within this phase, traffic will primarily utilize the existing roadways. Once the railroad embargo goes into effect, US 113 traffic will utilize the temporary road widening to the East through the RR crossing to allow for complete demolition of the existing RR crossing and construction of the new crossing. Construction will include the dualized US 113 roadways and connecting side streets, access drives/driveways North of Sta. 1520. Design submittals for Stage 3 construction work will consist of:

- Interim Geotechnical Design and Pavement Reports Submissions; and
- Final Design Road, Grading & SWM Plans for Stage 3 Roadway Construction Sta. 1520 North.

Stage 4 – Final Roadway Construction & Grading Sta. 1520 South. Within this phase, traffic will primarily utilize the existing roadway network through the project limits and existing traffic movements and patterns will be maintained. This stage will include the continuing construction efforts of the dualized US 113 roadways and connecting side streets, access drives/driveways south of Sta. 1520. Design submittals for Stage 4 construction work will be the Final Design Road, Grading & SWM Plans for Sta. 1520 South.

Stage 5 – Project Completion and Acceptance. Construction work in this stage will include installation of intersection lighting, signing, landscaping, final roadway paving and markings, and the full opening of the US 113 dualized roadways. Design submittals for Stage 5 construction work will consist of:

- Traffic Definitive and Final Design Plans for Lighting and Signing & Marking Submissions; and
- Landscape Definitive and Final Design Plans Submissions.

EXPEDITING CONSTRUCTION OF CRITICAL PATH ITEMS – Utility relocations drive the critical path of the schedule. This work is expedited by starting relocations as soon as R/W clearance is obtained. A clearing & rough grading design submittal will facilitate early clearing and rough grading to accommodate the utility relocations. The total duration of utility relocations is scheduled as 9 months to allow adequate time for communication lines to be moved following power pole relocations. The critical path also flows through Stage 2 and Stage 4 construction; however, there is adequate time to construct these improvements. As described under Schedule Management, AI will aggressively manage the schedule to identify potential schedule challenges early. To expedite construction and ensure the schedule is met, AI will adjust resources and facilitate early completion of the PROJECT.

Project Critical Path

The PROJECT's critical path relies on the clearing of utilities, specifically these activities:

- Clearing & Rough Grading Submissions
- Stage 2 Clearing and Grubbing
- Stage 2 Grading for Utility Relocations
- Utility Relocations (by Utility Owners)
- Stage 4 Roadway Construction

2.09.03 B. PROJECT MANAGEMENT

The AI/WM Team's successful management of the PROJECT is supported by our experience teaming together on design-build (DB) projects and pursuits, key staff that worked together previously on an SHA DB project, and integrated design and construction staff that will work together collaboratively throughout the delivery of the PROJECT. AI and WM have worked together on six DB projects and pursuits, and several key staff identified for the PROJECT were instrumental in delivering the Contee Road DB project to SHA. Established working processes and standard operating procedures ensure integration of design and construction personnel, as well as collaboration with SHA.

Key Personnel for US 113 that worked together on Contee Road

- *Lew Glassmire – DBPM*
- *Eric Sender - DM*
- *Diane Durscher – H/H*
- *Roberto Barcena – Geotech*
- *Joan Floura – Landscape Architect*
- *Matt Allen – Traffic Eng*
- *Dave Borusiewicz – Structural Eng*

PROJECT COMMUNICATION PLAN

The AI/WM Team believes that a partnering approach is extremely beneficial to this project. Both AI and WM have extensive partnering experience from utilizing the process on SHA projects in the past, as well as various other design-build and design-bid-build projects throughout the country. The AI/WM Team will work collaboratively with SHA to organize a partnering project team according to SHA's Partnering Guidelines.

COMMUNICATION INTERNAL TO THE DB TEAM – The AI/WM Team has established communication channels within the Design-Build Team based on our key personnel's previous experience working together as well as collectively developing our technical approach for the PROJECT. Our internal communication will include formal meetings as well as daily communication between design and construction counterparts.

Technical Meetings – Design staff will collaborate with construction staff through design development and completion to expedite the design process and allow construction to begin as early as possible.

- *Technical Work Groups* – Weekly meetings during design development comprised of all pertinent design disciplines and their construction counterparts.
- *Design Team Meetings* – Weekly meetings focused on integrating all aspects of design and enhancing constructability of the PROJECT.
- *Pre–"Over the Shoulder" Reviews* – Design and construction staff will meet to organize and prepare for the owner/stakeholder collaboration meetings

Construction Progress Meetings – Construction coordination meetings will include daily coordination, weekly planning and scheduling, and morning and end-of-shift huddles.

- *Daily Coordination Meetings* – The Superintendent will lead daily on-site coordination meetings and encourage open communication about construction progress.
- *Weekly Planning and Scheduling Meetings* – Development of Look Ahead Schedules will maximize construction planning efforts and will include the CM, Superintendent, and design staff as needed.
- *Daily Morning and End-of-Shift Huddles* – Construction crews will review safety aspects of every work operation and provide updates to the project schedule.

COMMUNICATION WITH THE ADMINISTRATION – We will locate SHA's office next to ours on the jobsite, and regularly meet with SHA onsite for coordination during design and construction. Formal monthly meetings and informal partnering will be utilized as a key strategy to address small and significant issues quickly and effectively. By establishing the "partnering" processes and empowering our senior managers on the PROJECT, we can assess, discuss, document and decide the approach to resolve issues quickly with minimal impacts to schedule and cost. In addition, our approach is to coordinate closely with SHA's Environmental Planning Division, Highway Hydraulics Division, and Landscape Operations Division throughout the PROJECT.

COMMUNICATION WITH EMERGENCY RESPONDERS, MD/DE RAILROAD, AND UTILITIES – *Table 2.09.03.01* illustrates our communication with service stakeholders having a daily interest in project construction to keep them apprised of how their individual operation may be affected.

Table 2.09.03.1 Communication with Emergency Responders, MD/DE RR and Utilities

IMPACTED AGENCY	AI/WM TEAM COMMUNICATION APPROACH
▪ Newark VFC ▪ Snow Hill VFC ▪ Berlin VFC ▪ State/Local Police	▪ Designated Emergency Representative, AI's Gus Everhart (experienced Volunteer Fireman), will provide emergency cell number in case of any problems. ▪ Weekly meetings with Fire Station Personnel to coordinate prior to road closings.
▪ MD/DE Railroad	▪ Designated RR Coordinator, Edward Smith, PE (former MTA Chief Engineer), will coordinate during the design phase with the RR representative to define proposed grades to ensure proper transitions from pavement to crossing are met.
▪ Delmarva Power ▪ Verizon ▪ Choptank Electric ▪ Maryland Broadband Cooperative Power	▪ Designated Utilities Coordinators, Bill Wallace and Rick Tisa, will coordinate and partner with utility companies to confirm relocation areas identified are included in the PROJECT's "limits of disturbance" and covered by the necessary permits. ▪ Investigate and suggest that a utility corridor be established within the R/W that is being acquired.

COMMUNICATION WITH THE PUBLIC – The AI/WM Team will provide comprehensive support to SHA for Public Outreach. We will plan, implement, and document all public communications, in close coordination with SHA, and will actively participate in all outreach efforts. Ray Moravec will oversee Public Outreach and will work directly with our subconsultant, Remline to develop narrative and graphic material public dissemination. They will visit the site regularly and participate in partnering meetings to ensure understanding of the PROJECT's details. Upon award, they will develop a contact database that will include internal and external stakeholders.

Multi-Faceted Communications Approach

- Inform stakeholders of study efforts early and continuously
- Inform and involve area residents about the PROJECT and to provide opportunity for input and response into the study process
- Utilize methods to ensure those not traditionally involved in the project development process are justly informed of the study efforts and heard

Some of the strategies our Team will implement include attendance/preparation of displays for periodic project update meetings, utilize VMS/temporary signage to provide advance notice to property owners when their access points change, assist with education on the use of J-Turns and Maryland "T" intersections, and when new access roads are opened coordinate with the U.S. Postal Service for new mailing addresses.

We will hold frequent public outreach meetings with the SHA Public Outreach team to discuss coordination efforts, stakeholders, and potential PROJECT issues. Various tools will be used to communicate with the public. The type of communication will be determined based on the message being delivered and the desired audience. Of primary concern to the public will be the maintenance of vehicular, pedestrian, and bicycle traffic during construction. Temporary and/or emergency utility outages may also present challenges to adjacent property owners. There is no question that the PROJECT will result in inconveniences. Safety will be rigorously addressed, both in and around the work zone. To balance impacts, the AI/WM Team will deliver efficient and quality performance that earns the public's trust.

The public will receive project information in several ways, including open houses, community meetings, a website, press releases and project update fliers. As the design for the PROJECT develops and impacts are identified, outreach efforts will become more focused and individualized for communities and impacted parties.

DOCUMENTATION AND CONTROL – Communication within the AI/WM Team, between the Team and SHA, and all project stakeholders throughout all phases of design/construction is crucial to the PROJECT's success. Prior to starting the submittal process, the AI/WM Team will establish a list of all parties involved in the PROJECT. Communication and distribution protocols will be established at the project initiation meeting and maintained throughout the duration of the PROJECT.

All design submissions to SHA will be made and tracked through the use of ProjectWise, an effective tool to store and update project documents, including CAD files, reports, estimates, and other large files. We utilize the latest version of the SHA workspace for CAD standardization. SHA's Materials Management System (MMS) will be utilized for materials management to document and approve material source of supply. Submittals, shop drawings, and catalog cuts will be transmitted in accordance with the distribution protocols established by the appropriate parties (i.e. Traffic Operations, the Office of Highway Development, or engineering consultants as appropriate). E-mail will be used to expedite communication and share certain drawings, meeting minutes, etc. between the AI/WM Team and SHA.

All project correspondence and communication with be documented within AI/WM's project management software system including submittals, transmittals, RFI's, and meeting minutes. Communication with MD/DE Railroad, utility companies, the public, impacted stakeholders, and community officials will be documented within this system and SHA will be promptly informed about any communication and provided a copy. Documentation addressing concerns of the public will include meeting minutes, correspondence, and e-mails.

COORDINATION MANAGEMENT PLAN

PHASED ACQUISITION OF RIGHT-OF-WAY – Addendum No. 2 has detailed a phased approach the SHA has taken to clear the R/W, starting at the North end. The first R/W Phase of the PROJECT will be cleared by April 30, 2015, the second by May 29, 2015 and the entire R/W by June 30, 2015. For this reason, we will prepare design plans and permit applications for the northern portion of the PROJECT (Stage 1) as our first priority, followed as R/W and permit requirements allow, and will then move on to the remaining portions.

CONCURRENT UTILITY WORK AND RELOCATIONS – Coordination for utility modifications will be provided by the AI/WM Team. Our Team will be responsible for coordination of all activities during design and construction with regard to utilities and permits. It is anticipated that various utility companies will relocate their underground and overhead facilities prior to and during road construction activities. Scheduling the utility relocations will be critical. For utility relocations during road construction activities, we will coordinate proposed areas for the utility relocations' material storage, haul routes, maintaining public access, and traffic control issues. Utility companies responsible for design and construction of their own utilities are Verizon, Choptank Electric, Delmarva Power, and Maryland Broadband Cooperative.

The AI/WM Team will work with Mr. Bruce Poole (SHA District 1 Utilities Engineer) to coordinate relocations. We will develop a utility map graphically showing all existing utilities with the proposed R/W to the same scale as the roadway plans. Existing utilities will be clearly indicated and labeled. All proposed utility relocations will be kept current and made available for review by the SHA and utility company staff. Our Team will coordinate in advance with SHA and the utility company regarding shut-off/diversion announcements. Written notice to the affected parties will be prepared in advance by our Team. To ensure the success of the relocations and maintain the project schedule, monthly utility coordination meetings will be held.

Each potential utility conflict noted in the RFP SP-TC Section 3.15, Utility Design and Relocation Design has been incorporated into our schedule. The AI/WM Utility Coordination team has also conducted discussions with each private utility having a potential conflict to further understand their concerns and the scheduling implication of the relocations. Further our design team is working to mitigate the number of utility relocations required through adjusting design when and where appropriate to avoid relocations and potential shut downs.

PERMIT RESTRICTIONS – The AI/WM Team has reviewed all Environmental Permits already provided by the SHA and is completely aware of the permits that our Team must obtain. One extraordinary permit restriction due to the location of the PROJECT is the minimization of impacts along forest edges to prevent disturbance of Forest Interior Dwelling Species (FIDS) habitat during their breeding season. We will adhere to the time of year clearing restrictions (May through August; with the exception of north of Station 1509) to minimize disturbance during the FIDS breeding season. Other permit requirements and compliance examples are detailed in the Environmental Approach section.

Our Environmental Compliance Manager will track commitments and permit conditions through design and construction. Our Environmental Control Manager will interface directly with SHA's Independent Environmental Monitor (IEM) on a daily basis to ensure compliance during construction. Through this coordination, we will have direct knowledge of the IEM's observations/review of activities and can minimize any non-compliance reports to SHA, USACE, and MDE. Our Team will coordinate with the IEM throughout the design-build process, both in design and construction and will produce a Compliance Report each quarter.

CONCURRENT MD/DE RAILROAD WORK – The Administration Design Project Manager will schedule a Pre-Design meeting once NTP has been issued. The purpose of the meeting is to:

- Develop a coordination plan between the Design-Builder, SHA and the Railroad. This plan will include the types of coordination as noted in the RFP and in addition to that will take place, when each type of coordination should take place and the frequency it should take place, if applicable.
- Preview and discuss the preliminary maintenance of traffic and construction sequencing concepts developed by the DB Team for this area and the PROJECT in general as they relate to this work.
- During construction, additional meetings will coordinate railroad maintenance of traffic with roadway maintenance of traffic.
- MD/DE railroad construction requirements and needs will be discussed and coordinated.
- This initial meeting will be utilized to discuss the dates of the proposed Railroad Embargo, since our Construction Schedule would support an earlier Embargo date than currently proposed.

RISK MANAGEMENT

In consideration of the issues and risks facing the DB Team and SHA, the AI/WM Team reviewed the conceptual drawings/draft RFP and visited the project site to evaluate the existing conditions of US 113 along the corridor. A description of the impacts of several project risks and the AI/WM Team's mitigation strategies to ensure these risks are successfully mitigated/managed are included in *Table 2.09.03.2*. The risks include:

- Concurrent Utility Relocations
- MD/DE Railroad At-Grade Crossing
- Environmental Permitting/Impacts
- Emergency Response Access
- Property Owner Coordination and Maintenance of Access
- Maintenance of Traffic
- NTP Prior to R/W Clearance

Collaborative coordination between the AI/WM Team and SHA to align specific mitigation strategies will ensure the impacts identified are avoided and the PROJECT is delivered on schedule and within budget.

DESIGN AND CONSTRUCTION MANAGEMENT

The AI/WM Team's approach to design and construction management emphasizes teamwork and partnering, both within our DB Team and with SHA and the project stakeholders. Design-build is a potentially powerful tool for innovative project delivery, but it has to be executed in an environment of mutual trust, a willingness to make decisions in real-time, and with a constant eye on the ultimate goals of the PROJECT. We have provided SHA with a team of individuals who understand that environment and have the experience and expertise to ensure that schedule, costs, and project controls are balanced to deliver a quality product.

Table 2.09.03.2 Strategies to Mitigate PROJECT Risks

DESCRIPTION	IMPACT	CATEGORY	AI/WM TEAM MITIGATION STRATEGIES
Concurrent Utility Relocations	Schedule delays/ resequencing	▪ Construction ▪ Management	▪ Ensure concurrent utility relocations are within the PROJECT's LOD through coordination. ▪ Establish utility corridor within R/W. ▪ Locate and maintain delineations of relocated UG utilities.
MD/DE Railroad At-Grade Crossing	Schedule delay due to lack of under standing requirements	▪ Construction ▪ Management	▪ Proposed dualization at RR crossing, removal of existing at-grade and Newark Rd South crossing will be part of a separate design package developed early to finalize approved and permitted package prior to construction.
Environmental Permitting/ Impacts	Schedule delays due to changes to the approved permits and environmental impacts to existing FIDS.	▪ Design ▪ Construction ▪ Management	▪ Maintain compliance with environmental permits including the WUS/wetland permit, SWM/E&SC approvals, and reforestation site review permit. ▪ Ensure all design package submissions, and specifically SWM/E&SC, contain and address the latest guidelines as defined by SHA and MDE. ▪ Evaluate maintaining forest canopy closures. ▪ Adhere to time restrictions for impacts to FIDS and WUS. ▪ Stake out the approved E&SC Plan LOD and install orange construction fence to protect resources outside of the LOD.
Emergency Response Access	Public safety during construction of the PROJECT.	▪ Construction ▪ Management	▪ Maintain constant communication and partner with all emergency responders. ▪ Monthly progress updates utilizing project flyers and maps to define/identify changes to existing access points. ▪ Hold specific progress meetings for emergency response at the Newark Volunteer Fire Co. in addition to local/state law enforcement and Atlantic General Hospital.
Property Owner Coordination and Maintenance of Access	Public perception/ complaints from adjacent residents/ businesses.	▪ Construction ▪ Management	▪ Coordinate a Public Outreach program with SHA to include flyers mailed directly to affected property owners. ▪ Utilize VMS/temporary signage to provide advance notice to property owners.
Maintenance of Traffic	Public safety and mobility during construction	▪ Construction ▪ Management	▪ Develop a comprehensive TMP to understand the existing traffic users, patterns and challenges. ▪ Carefully design geometrics/MOT and execute traffic control at 3 "crossover" areas, where existing road switches from being NB to SB, to continually maintain traffic.
NTP Prior to R/W Clearance	Delays to starting or progressing construction	▪ Construction ▪ Management	▪ Design/develop construction phased packages for approval, proceeding from the North to South to coincide with phased R/W clearance. ▪ Coordinate with SHA to define areas where R/W clearance has not progressed to limit risks to SHA and DB Team. ▪ Adjust design and construction package if a particular segment is not clear for construction as anticipated.

DESIGN MANAGEMENT – Project Design Manager, Eric Sender, will be responsible for overall management of the Design Team to ensure quality design submittals are completed on-time. Coordination of subconsultants and their design assignments can be challenging, like putting the pieces of a puzzle together. Eric will communicate clear direction to the subconsultants and integrate them as a seamless extension of the WM Design Team. He will conduct progress reviews weekly to measure progress towards milestone targets and conduct QA checks of their work product. Managing subcontractors' work product is paramount in meeting the overall design submittal deadlines.

Initially, all design criteria, specifications, and other reference documents pertinent to the design of the PROJECT will be gathered by the Design Team. Upon the approval of the Design Quality Control Manager, Bruce Dombroski, the Design Team will create a "Project Design Criteria" file as part of the Design Quality Control Plan. The purpose of the Design Quality Control Plan is to document procedures to be used by the Design Team to achieve a high quality design. The AI/WM Team will prepare and submit a written Design Quality Control Plan with accompanying design schedule for review and approval by the SHA prior to NTP. Procedures and methods within the Plan will include:

- Coordination and communication between disciplines, members of immediate design teams and subs especially in areas of constraints and areas of temporary conditions to ensure that both environmental and safety issues are addressed economically.
- Design QC Manager will optimize design to address both environmental and safety issues.
- Designers will work with the Contractor to develop methods of construction, which limit environmental disruptions while providing optimal safety characteristics.
- Utilize latest technology for file transfers, communication to ensure each piece of design is consistent with the overall goals established.

CONSTRUCTION MANAGEMENT – Design-Build Project Manager, Lew Glassmire, will be responsible for execution of the work under the contract, including oversight of design and construction, coordination with third-parties, and managing the project risks and schedule to ensure timely completion. Construction Manager, Carmen Cipriano, will manage the construction process and will ensure that the materials used and work performed meet the contractual requirements. Carmen will coordinate with Design Manager Eric Sender to verify conformance with approved for construction plans and address any required field changes. He will provide construction progress updates and will support PR Manager Linda Moreland with public outreach efforts to address public concerns, communicate changes in access, and provide advance notification prior to changing the traffic configuration.

AI's philosophy of **Safe Production Done Right** uses a Production System approach that incorporates Quality, Safety, and Production into comprehensive operation planning. The planning process promotes inclusion where the Superintendents, QC Manager, Safety Manager, and Field Managers collectively review and provide feedback into operation plans. General Superintendent Bart Gibson will oversee this planning process and all field operations throughout the construction of the PROJECT. He is supported by a Construction Team that includes a Roadway and Structures Superintendents, Traffic Manager, Utilities Coordinator, Environmental Control Manager, and Survey Manager. *Table 2.09.03.3* highlights some of the guiding principles of the AI Production System.

Construction Quality Manager Kevin Denny will ensure that our Construction QC program is functioning and construction is compliant with the final design and specifications. Kevin will review work plans prior to the start of construction, and will oversee quality inspections of all operations. He will participate in weekly project construction planning meetings held by CM, Carmen Cipriano and attended by the Superintendents, Managers, and Foremen to review upcoming work activities.

Table 2.09.03.3 AI Construction Approach

AI GUIDING PRINCIPLES	BENEFITS TO THE PROJECT
Get quality right the first time by building it into our operational plans and empowering employees to stop or slow down production to quickly correct any defects that surface.	✓ Quality planned into all operations ✓ Controlled production that minimizes schedule risks ✓ Prompt resolution of any quality issues that may arise ✓ Minimized warranty issues
Collectively plan for and create safe, delay-free work areas.	✓ Reduced safety and schedule risks
Ensure continuous improvement by standardizing operations, making them transparent, and relentlessly examining them for improvements.	✓ Consistent quality construction ✓ Transparent communication
Respect our extended network of subcontractors and suppliers by challenging them and helping them improve.	✓ Extension of quality and safety practices to subcontractors

Operational planning is followed by implementation and adjustment to address specific field challenges. The challenges to consider for the PROJECT include maintenance of traffic, access management, and noise/dust control. Considering these elements as well as unique operational challenges, AI proactively manages project risks. AI's process to Act, Improve, and Repeat will be utilized to improve performance on each operation. A description of each of before, mid, and after action reviews is included in *Table 2.09.03.4*.

Table 2.09.03.4 Effective Operational Reviews

BEFORE ACTION REVIEW	MID ACTION REVIEWS	AFTER ACTION REVIEWS
▪ Held prior to planned operation ▪ Communicates quality, safety, and production goals to crews ▪ Gains alignment and identifies responsibility for quality production	▪ Held early for critical operations ▪ Involves all stakeholders to address concerns regarding quality, safety, and schedule ▪ Confirms the crew and equipment are the right size/type	▪ Held at completion of operation ▪ Reviews quality challenges and resolutions ▪ Results documented and incorporated into future operations

PARTNERING WITH THE ADMINISTRATION – Upon NTP, the Formal Partnering Process will be initiated, establishing both internal and external relationships that will continue throughout the life of the PROJECT. Inclusion of project management, executive support, field managers, safety representatives, and major suppliers and subcontractors fosters open communication at all levels and facilitates resolution of conflicts at the lowest responsible management level. The Partnering Kick-off Workshop Meeting provides an opportunity to develop a mission statement that each stakeholder can support, including SHA, the DB Team, and third-parties.

Partnering is engrained in our culture at American Infrastructure. In fact, something we call *The Collaborative Way* is infused into everything we do, building a culture of working together to harness collective intelligence. All employees are oriented into *The Collaborative Way*, which encompasses five core areas:

- Listen generously to sets aside preconceived conclusions and understand other's perspectives.
- Speak straight and addresses issues in a forwarding manner to resolve conflicts.
- Quickly clean up any misunderstandings that affect working relationships.
- Clearly define commitments and communicate when deadlines may be in jeopardy.
- Acknowledge and appreciate specific and meaningful contributions.

Each aspect of *The Collaborative Way* is practiced throughout the AI organization and integrated into our culture at the project level. This organizational commitment to collaboration realizes our objectives of customer satisfaction, schedule certainty, minimized costs, innovation, and flexibility.

SCHEDULE MANAGEMENT

Detailed planning and scheduling are the foundation of our approach to project management. The CPM Schedule will be the driving force behind all long-term and short-term planning and will be used to plan, organize, and execute the work. Our approach to schedule management emphasizes staying ahead of construction crews, eliminating obstacles, and communicating the plan before the work occurs. In addition to the CPM schedule, the AI Team will utilize the complete schedule process detailed in the *Table 2.09.03.5*.

Table 2.09.03.5 Schedule Management Tools

TOOL	DESCRIPTION
CPM Schedule	The CPM baseline schedule will be submitted to SHA for approval and updated monthly.
Design Schedule Management	During the design phase, the design work groups will monitor design progress and provide schedule updates.
Work Plans	Operation-specific planning packets will be created for each construction operation.
Project Team Planner	Schedule based to-do list of management tasks will identify work zone, crew and equipment needs, and remove work operation constraints.
Daily Huddles	Morning and End-of-Shift coordination meetings for field operations will provide daily schedule updates to construction management staff.
Look-Ahead Schedules	Milestone focused look-ahead schedules will break down activities into day-to-day operations for further coordination and planning. Weekly construction schedule meetings will coordinate upcoming activities, traffic controls, subcontractors, and submittals.

ADAPTING TO UNEXPECTED SCHEDULE CHALLENGES – Our planning and scheduling process prevents unanticipated delays through inclusion of design staff, construction staff, subcontractors, and stakeholders during schedule development. Daily construction operation planning, weekly look-ahead schedules, and monthly CPM updates facilitate early awareness of any issues meeting the schedule milestone dates. If the potential for schedule slippage occurs, the necessary adjustments will be made and may include utilizing additional shifts and additional crews to accelerate construction.

CHANGE MANAGEMENT

AI's approach to change management can be summarized as Start Right, Stay Right, Manage Change, Manage Conflict. The philosophy of this approach is to expedite planning efforts to identify project risks and mitigate/minimize potential changes. As a lump-sum design-build contract, the AI/WM Team does not anticipate changes within the scope of work and have incorporated the elements identified in the scope of work in our cost proposal and project schedule.

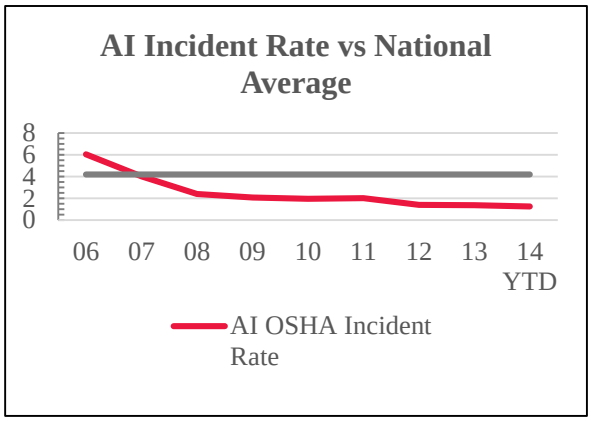
Our Team will proactively coordinate with project stakeholders to prevent and reduce the risk of changes outside of the scope of work defined for the PROJECT, including early and continuous coordination with utilities along the corridor. However, changes in PROJECT's scope may become necessary to address various needs, such as differing field conditions, or requests by various stakeholders through partnering. Should changes to the scope of work occur, the necessary authorizations will be secured prior to incorporating any scope change with respect to design or construction. The AI/WM Team will review the potential changes with SHA to collaboratively align to the best solution for the PROJECT. This approach was effectively utilized on the Contee Road DB project, resulting in achievement of project milestones ahead of schedule despite changes in the scope of work.

Field changes to previously approved plans shall be subject to the same level of review as the original design to assure that the PROJECT meets or exceeds the project requirements. It is essential that identification of field problems, investigation of solutions with designer input and review, and if necessary design of proposed changes be accomplished expeditiously to avoid delay.

SAFETY MANAGEMENT

Safety is of paramount importance to the AI/WM Team and our focus includes construction works, roadway users, site visitors, inspection staff, SHA personnel, and any other individuals that enter the work zone. In 2008, AI implemented an initiative called *Home Safe Tonight* which is a commitment, both personal and organizational, to create an existence absent of incident and injury. Since implementation of *Home Safe Tonight*, AI has reduced its recordable incident rate by 70% to a *Best in Class* rate of 1.24 as shown in *Figure 2.09.03.1*.

Figure 2.09.03.1 AI Incident Rates since 2006



Safety is recognized as an inseparable element of each construction operation. For the PROJECT, the AI/WM Team will develop a project-specific Health and Safety Plan. Safety challenges and risks will be identified on a project level as well as an operation level. Integral to our proactive approach to risk assessment is an operation-specific Job Hazard Analysis which will be completed during the planning stages of each work operation. Prior to starting an operation, construction crews will review the associated hazards. Throughout construction, daily morning and end-of-shift huddles facilitated by our field managers for each construction crew will enforce our focus on safety and provide a forum to address any safety concerns.

The safety risks for the PROJECT include existing maintenance of traffic, overhead utilities, and the MD/DE Railroad crossing. Safe work procedures for utilities include maintaining current Miss Utility tickets, locating underground utilities, and carefully planning work with overhead utilities including the use of overhead wire signs, tattle tales, and use of spotters. For the Railroad crossing, workers will attend the appropriate safe training and utilize safe work procedures when working in the vicinity of the railroad. The most significant safety risk for workers, roadway users, and site visitors will be the challenge of widening the roadway adjacent to active traffic. Our assessment of this risk and our approach to safety management is highlighted in *Table 2.09.03.6*.

Table 2.09.03.06 Traffic Safety Risks and Management

Group	Risk Description	Management Strategies
Workers	Working alongside traffic without barrier wall	▪ Develop effective TMP to minimize risk of traffic entering work zone. ▪ ATSSA certified staff responsible for implementing MOT devices. ▪ Review of specific operation hazards at daily huddles.
Road Users	Driving through the active work zone, changing traffic patterns, construction traffic exiting/entering travel lanes, and reduced visibility during night operations.	▪ Effectively implement traffic controls to reduce likelihood of incidents due to construction. ▪ Utilization of the existing roadway to construct the new roadway. ▪ Notification prior to traffic changes via VMS boards. ▪ Construction access points designed according to standards while taking into account specific site constraints. ▪ Clear delineation of entrances and closure during non-working hours. ▪ Adequate accel/decel lanes for construction vehicles. ▪ Proper illumination of vehicles and employees and lighted work zones during night operations.
Site Visitors	Traffic adjacent to the work area, unfamiliarity with site conditions.	▪ Coordination with on-site construction management personnel prior to entering construction work areas. ▪ Site-specific operation overview and hazard discussion. ▪ Use of proper PPE for visibility and protection.

2.09.05 Environmental Approach

2.09.05 ENVIRONMENTAL APPROACH

Minimizing the PROJECT's footprint is paramount to successfully reduce disturbed areas, pollutant discharge and protect natural resources. The AI/WM Team incorporates Environmental Stewardship in our designs and construction methods, activities, and practices. Our staff is trained in various aspects of environmental features and the importance of each, consequences of temporary and permanent construction impacts, and techniques to avoid and minimize natural resource impacts and disturbed areas.

UNDERSTANDING OF MAJOR ENVIRONMENTAL FEATURES ON THIS PROJECT

The environmental resources along the PROJECT include socio-economic resources, cultural resources, air quality and natural resources. Through the NEPA process and subsequent permitting, all of these resources have been avoided or minimized to the extent feasible. Unavoidable impacts have been mitigated by SHA. We have a comprehensive understanding of the environmental resources along this corridor and will continue to deliver a project that is sensitive to the environment. The major environmental features on the PROJECT include natural resources; namely, Waters of the US (WUS), wetlands, 100-year floodplain, forest and Forest Interior Dwelling Species (FIDS) habitat.

The PROJECT will impact WUS, including wetlands associated with the Five Mile Branch and Marshall Creek watersheds. Through the joint permit process, MDE and the USACE have permitted impacts to 27,896 SF of wetlands, 167,515 SF of permanent impact to wetland buffer, 1,678 linear feet of permanent impacts to streams and disturbance to the floodplain. There are forested impacts equaling 13.39 acres approved by DNR for the PROJECT. The project area is within portions of FIDS habitat. The SHA has already incorporated minimization measures in the PROJECT to avoid impacts to forest interiors and minimize construction disturbance during the FIDS breeding season (May through August).

PERMIT ACQUISITION/COMPLIANCE AND ADDRESSING ANY NON-COMPLIANCE ISSUES

PERMIT ACQUISITION – There are several environmental permits (*Table 2.09.05.01*) which are required by various government agencies. To ensure compliance with the environmental permits, the AI/WM Team will coordinate with SHA, as well as directly with approving agencies (as directed by SHA).

Table 2.09.05.1 Summary of Environmental Permits

PERMIT/APPROVAL	AGENCY	STATUS	MAJOR CONDITIONS
Wetlands and Waterways Permit	USACE/MDE	Received and valid through August 20, 2017	▪ No in-stream construction between March 1-June 15 ▪ Coordinate with Independent Environmental Monitor ▪ Super Silt Fence at all wetlands and stream crossings.
Reforestation Site Review Permit	DNR	Received	▪ Only Forest Impacts allowed as shown on the Forest Impact Plates
Erosion and Sediment Control Approval	MDE	AI/MD Team responsibility	▪ Off-site borrow or waste sites required SCD and/or MDE approval ▪ Notify MDE at least 7 days prior to project initiation
Stormwater Management Permit	MDE	AI/MD Team responsibility	▪ ESD to the MEP before BMPs are used ▪ Meet or exceed Water Quality Banking Credit
NPDES Construction	MDE	AI/MD Team responsibility	▪ Maximum LOD area is established

USACE/MDE Wetland and Waterway Permit – The permit has already been acquired and is in effect from Aug 20, 2014 to Aug 20, 2017. This permit allows impacts to certain wetlands and WUS, which are indicated on the approved wetland plates. Any additional impacts will require further approval from USACE/MDE. There is a reduction incentive of $8,000 for every 0.10 acre of wetlands saved below the level permitted as shown on the Wetland Impact Plates. *Based on our review of the PROJECT, we do not anticipate any additional impacts to wetlands and waterways.* The AI/WM Team will investigate minimizing the length of new culverts through refinements to roadway geometrics and roadside features/grading to reduce permitted impacts.

Reforestation Site Review Permit – Forest impacts are 13.39 acres as quantified by SHA and included in the Forest Impact Plates. However, with our investigation of the project site, we identified and advised SHA of an additional forest stand not shown on the impact plates. Consequently, the total impacts noted above will increase. SHA will revise the site review permit and provide updated forest impacts. *The AI/WM Team anticipates reducing forest impacts through pursuing the use of linear SWM facilities and minimizing the use of off-site drainage collection swales.* The Team will continue to look for opportunities to avoid and minimize forest impacts further. A Tree Impact Avoidance and Minimization Report will be prepared and the Planting Zone Concept Plan which provides design of forest that qualifies as "reforestation" will be followed. The plantings that SHA currently anticipates to qualify as "reforestation" is 5.64 acres, which is the on-site reforestation required by the permit. Our Team will further evaluate plantings to increase the amount of on-site reforestation beyond the 5.64 acres. We will also provide landscaping for agrarian, roadside buffer, and stormwater management plantings.

MDE SWM/E&SC Permit – This permit has not been secured; however, MDE issued the Letter of Intent on October 2, 2014 indicating that the concept SWM hydrology is acceptable. The AI/WM Team is responsible for obtaining this permit; therefore, the design package sequence and compilation is partially organized around the required submittal packages to obtain this permit. As discussed in the Schedule Narrative, an E&S control permit will be acquired for the Stage 1 North's and Stage 2 South's clearing and rough grading efforts so that construction will be able to start while the final designs are being performed. During the concurrent design/construction process, modifications to the SWM/E&S permit will be sought with each phase of the final roadway construction. The modifications will be based on design packages that include complete E&S and SWM for the areas being proposed for construction. Coordination with the SHA and MDE accordingly will occur throughout the process.

Notice of Intent (NOI) General NPDES Permit – The AI/WM Team is responsible for obtaining the approved NOI. SHA will submit the NOI to MDE based on AI/WM's proposed LOD limits. The NPDES will not be approved until the initial MDE E&S approval is granted. The NOI will be based on a conservative LOD value which will not expand during the design process, maintaining a valid NPDES permit through the life of the PROJECT.

NEPA Documentation/Approval – A NEPA document was prepared and approved by FHWA in 1998; with a Reevaluation approved June 25, 2014. Any recommended changes to the PROJECT by the AI/WM Team will require documentation and evaluation with SHA (and FHWA) to ensure that the findings of the NEPA document are still valid. Previous coordination with government agencies does not reveal any cultural, archeological resources or any rare or endangered species that will be affected by the PROJECT. Based on our review, we do not anticipate additional changes that will affect the NEPA document or result in additional impacts. Any modifications of the LOD or design changes outside of the LOD will be reviewed for potential environmental and cultural impacts. If changes are warranted, our Team will provide all necessary information (narratives, figures) supporting the changes and forward that information to the SHA. The SHA shall prepare the NEPA Reevaluations and coordinate approvals with the regulatory agencies (Maryland Historic Trust, USFWS, DNR, FHWA, etc.).

FIDS Habitat – Based on the coordination between SHA and DNR, there is Forest Interior Dwelling Species (FIDS) habitat near the project area. The project impacts are along forest edges and will not disturb the FIDS habitat; however the AI/WM Team will adhere to time of year restrictions (with the exception of north of Station 1509) to minimize disturbance during the breeding season. These restrictions regarding FIDS habitats are not provided as a permit, however it is inherently part of the NEPA Approval and the USACE/MDE and DNR Permits.

COMPLIANCE AND ADDRESSING NON-COMPLIANCE ISSUES – Special conditions of the USACE and MDE permits for wetland and WUS impacts require SHA to have an Independent Environmental Monitor (IEM). The IEM will be hired by SHA to ensure that the permit conditions are met. Our Environmental Compliance Manager will track commitments and permit conditions through design and construction, and our Environmental Control Manager will interface directly with the IEM on a daily basis to ensure compliance during construction. Through this coordination, the AI/WM Team will have direct knowledge of the IEM's observations which will assist in responding to corrective measures promptly and minimizing any non-compliance reports to SHA, USACE, and MDE. Our Team will coordinate with the IEM throughout the design-build process. We will produce a Compliance Report each quarter, which tracks compliance with the permitting commitments and impacts to wetlands and WUS. This report will be submitted to SHA and the IEM will review this report and advise the AI/WM Team of any deficiencies in compliance. If there are any deficiencies, depending on the severity, we will either make the correction in the field or prepare a design fix for the IEM's review. Addressing environmental compliance concerns is always considered as high priority to our Team. During design, when the final plans are provided to the E&S QA/QC reviewer prior to the MDE submittal, the plans will also be provided to the IEM for review. The AI/WM Team will evaluate and incorporate comments regarding improving the protection of the natural resources or reducing the impacts to these resources. During construction, the IEM may request adjustment to the implementation of the approved E&S plan to address unforeseen site conditions. The direction to make these changes will come from SHA and the AI/WM Team will make adjustments as required.

COORDINATION WITH PERMITTING AGENCIES AND THE ADMINISTRATION – A pre-permitting meeting will be held with SHA, the AI/WM Team, and the MDE SWM/E&S reviewer to discuss permitting timeframes, submission schedules, and SHA's expectations. Although an LOI for SWM has been processed by MDE accepting the Concept SWM Report, before any design is completed, our Team will meet with MDE to discuss our ideas for improved SWM and to determine the guiding SWM principles governing the PROJECT. This meeting will be in addition to the pre-permitting meeting to facilitate a smooth MDE review process and confirm acceptable ESD practices.

In order to ensure a smooth review process of the E&S plans, the plans will be reviewed by an approved MDE reviewer on the AI/WM Team prior to submittal to MDE. Once the internal MDE reviewer certifies the plans meet MDE requirements, the SWM/E&S plans will be submitted to SHA and MDE concurrently. An E&S plan for mass grading will be submitted to MDE to initiate the issuance of the NPDES Construction Activity Permit.

IMPLEMENTATION OF AN EFFECTIVE EROSION & SEDIMENT CONTROL PLAN

The E&S plan will be designed based on the 2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control. All areas within the LOD will be treated with an E&S device. E&S design will include redundant controls to ensure treatment of run-off. When feasible, E&S controls which exceed minimum requirements will be used (i.e. earth dikes to divert runoff instead of diversion fence or Super Silt fence in lieu of silt fence).

Perimeter E&S controls will be installed first and will remain functional throughout the duration of the PROJECT. Clean water which flows into the project area from off site will be diverted around the site if possible to minimize runoff. If sediment-laden runoff flows to an undisturbed area within the site, it will be treated within the site with E&S devices. Tracking of sediment off-site will be reduced by having elongated stabilized construction entrances, wash racks, on-site concrete wash-out pits, etc. Any sediment tracked off site will be cleaned up immediately.

During construction, a cursory inspection of the E&S devices will be completed daily and E&S devices will be continuously maintained. AI will complete SHA's Form 00C61, which is used by the SHA Quality Assurance Inspector to ensure the E&S controls are functioning as designed. Once sediment basins and other E&S devices such as super silt fence and TSOSs reach a certain capacity of sediment, they will be cleaned out. Before a rainfall event, a more thorough inspection will be done to ensure the controls will be able to function. After each rain event, E&S controls will be inspected to determine how well the devices functioned. If any E&S controls failed, or are in danger of failing, they will be repaired immediately.

MEASURES TO ENSURE COMPLIANCE WITH COMMITMENTS

Our Environmental Compliance Manager, Jessica Klinefelter, CEP, will develop an Environmental Compliance Plan following NTP to identify permits, permit conditions, time-of-year restrictions, and Best Management Practices that will be employed. These items will already be incorporated into the design concept and project schedule. This document will identify a plan for compliance through the design and construction process. Design plans will be reviewed prior to submittal by Jessica for compliance. Design changes that require permit modifications or NEPA Reevaluations will be managed by Jessica.

The Environmental Compliance Plan will include a detailed schedule for design and construction activities so that permits and approvals are received when needed, field or pre-construction meetings are held per the IFB requirements, notifications to MDE occur prior to construction and within the time periods outlined in their permits, and time of year restrictions fit within the schedule without delaying construction progress. During construction, the Environmental Control Manager, Neph Eyassu, will work with the Team's E&SC Manager, Bart Gibson who is responsible for daily E&S compliance and will make certain:

- Controls are installed prior to starting construction and the E&S sequence is followed;
- Controls remain in place and functional throughout the duration of construction;
- Controls will only be removed with concurrence from MDE and the Administration;
- Repairs identified by weekly and post-storm event inspections are promptly corrected; and
- Any deviations to the sequence are approved prior to starting the work.

Table 2.09.05.2 Environmental Management Roles and Responsibilities

ROLE	RESPONSIBILITIES
Design-Build Project Manager Lew Glassmire	▪ Responsible for compliance with all laws and regulations, and SHA RFP/Specs. ▪ Ensures adequate resources to meet all environmental commitments.
Project Design Manager Eric Sender, PE	▪ Tracks regulatory requirements and communicates requirements to the Design Team. ▪ Ensures environmental commitments and requirements are incorporated into the design.
Environmental Control Manager Neph Eyassu	▪ Communicates daily on-site with the Independent Environmental Monitor. ▪ Directs on-site review of construction activities with respect to environmental permits. ▪ Recommends construction means/methods to avoid or minimize environmental impacts. ▪ Ensures all staff receives appropriate environmental training.
Environmental Compliance Manager Jessica Klinefelter, CEP	▪ Facilitates coordination with regulatory agencies. ▪ Tracks environmental commitments from clearances, permits, and approvals. ▪ Provides environmental technical guidance regarding implementation of environmental commitments. ▪ Performs quality assurance reviews and provides compliance reporting.
E&SC Manager Bart Gibson	▪ Responsible for the day-to-day E&S Control compliance during construction. ▪ Initiates and maintains E&S Control compliance inspections and authorizes the implementation of corrective measures. ▪ Maintains records of permits, approved plans, selected materials, and E&S inspections.
Project Inspectors and Engineers	▪ Oversees implementation of environmental commitments. ▪ Documents products and services in identifying environmental compliance activities. ▪ Takes appropriate action in order to maintain regulatory compliance.

Prior coordination between SHA and the Maryland Historic Trust (MHT) indicates that no cultural or archeological resources will be impacted by the PROJECT. If cultural resources are encountered during the Design phase, then further coordination with the SHA, MHT, and any other applicable agencies will occur. If archeological resources are unexpectedly encountered during construction, the AI/WM Team will immediately notify the SHA who will then notify the appropriate organization of the discovery.

In compliance with the USACE/MDE Wetlands and Waterways Permit, "Best Management Practices for Working in Non-tidal Wetlands, Wetland Buffers, Waterways, and 100-yr Floodplains" will be adhered to. According to the regulations, no in-stream work will occur from March 1 to June 15. Based on the coordination between SHA and DNR, there is FIDS habitat near the project area. The impacts of the PROJECT are along forest edges and should not disturb FIDS habitat; however the AI/WM Team will adhere to time of year restrictions (May through August) to minimize disturbance during the breeding season.

Conditions That Must be Met to Maintain Compliance	
▪ No in-stream construction March 1 to June 15 ▪ Coordinate with IEM ▪ Super Silt Fence at all wetlands and streams ▪ Only Forest Impacts allowed as shown on the Forest Impact Plates ▪ Maximum LOD area is established	▪ Off-site borrow or waste sites required SCD and/or MDE approval ▪ Notify MDE at least 7 days prior to initiation of the PROJECT ▪ ESD to the MEP before BMPs are used ▪ Meet or exceed Water Quality Banking Credit

Per the Reforestation Site Review Permit, forest impacts are approved for the PROJECT as indicated on the Forest Impact Plates. As part of the Roadside Landscape and Reforestation plans developed by the AI/WM Team, a Tree Preservation Fence will be placed along the forest to differentiate the area intended for disturbance and the remaining forest to be preserved. Forest will not be disturbed between May through August, with the exception of north of Station 1509. Trees removed or trimmed within the PROJECT shall be in accordance with the Roadside Tree Law and the Administration's 2008 Standards and Specifications. If the AI/WM Team impacts forest in excess of the anticipated acres approved, the AI/WM Team will be responsible for locating additional on-site reforestation areas, if available, and subsequently off-site reforestation areas.

The AI/WM Team will prepare and implement a plan for management and disposal of controlled hazardous materials and contaminated soil and ground water that may be encountered during structure demolition, land clearing, or excavation activities. There are two potential hazardous materials sites identified in the NEPA Reevaluation; the Sunoco Gas Station (7167 Worcester Highway @ Langmaid Road) and the Newark Wastewater Treatment Plant (7025 Worcester Highway). The current design does not impact these resources. The AI/WM Team will coordinate with SHA and MDE if there are any proposed changes in design near these two sites or if any unanticipated hazardous materials are encountered during construction or result from construction.

Compliance will be demonstrated by producing a Compliance Report each quarter, which tracks and confirms compliance with each commitment pertaining to the PROJECT, including wetland and waterway impacts. Environmental Stewardship that meets and exceeds the standards of the permits will be stressed.

PROTECTION OF ENVIRONMENTAL RESOURCES

Protection of environmental resources starts in design and then follows through in construction. The techniques, products, and practices described below will be utilized to reduce impacts and protect environmental resources while construction this phase of the US 113 corridor improvements.

ROADWAY DESIGN – The roadway design will reduce pollutants by using the existing roadbed footprint in conjunction with matching roadway existing geometry to reduce the amount of cut and fill. By using the established existing roadbed, mill and overlay practices will be implemented where feasible thereby reducing material impacts.

These low maintenance designs are preferred to reduce disturbance of the environment. To minimize impacts to environmental features, line and grade approval will be requested prior to requesting a permit for any clearing. The initial clearing phase will be limited to rough grading to the minimum requirements of the line and grade approval. Proposed changes to the prepared design will further protect the environment. Approved ATC #2 proposes shifting the location of the southern project limit southbound to northbound J-turn approximately 400 ft. to the north. This ATC allows the southbound roadway tie-in to take place without impacting the existing box culvert which will be extended under the future adjoining US 113 Dualization Contract; therefore, a single one time only construction of the box culvert replacement under the future adjoining contract will be more efficient and result in less in stream work. Multiple parallel ditches are proposed along the corridor to limit the drainage area to SWM facilities. However, wherever feasible, the AI/WM Team will reduce the double ditches to minimize the project footprint.

STORMWATER MANAGEMENT DESIGN – The SWM design will incorporate linear ESD facilities adjacent to US 113 where applicable to reduce the overall project footprint, minimizing forest impacts and land disturbance.

EROSION AND SEDIMENT CONTROL DESIGN – The ESC design will utilize phased construction to minimize amount of exposed earth during clearing and grubbing. Clear water diversions for offsite runoff will minimize the burden on E&S controls and reduce runoff which would ultimately create erosive conditions. Near environmentally sensitive resources, lower impact E&S controls, such as diversion fence, will be used to minimize waste. Where parallel ditches are proposed, the design will also utilize the outside ditch as clear water diversion to eliminate the need for external ESC devices, saving both waste and the project footprint. Tree protection fence or orange construction fence will be installed along the LOD in areas of sensitive environmental resources.

LANDSCAPE DESIGN – The landscape design will utilize native species to maximize the wildlife benefit. In addition, low maintenance ground over in landscaping is preferred.

CONSTRUCTION PRACTICES – The AI Team incorporates Environmental Stewardship into our construction practices. Installation, inspection, and maintenance of erosion and sediment control measures will be provided by staff trained and certified by MDE and SHA for Erosion and Sediment Control. In addition, our staff are certified SWPPP Preparers and Inspectors by *Stormwater USA*, an EPA recognized training and certification program. AI will follow established guidelines for Best Management Practices and will monitor compliance during construction to ensure construction impacts are minimized. Specific construction techniques and practices the AI/WM Team anticipates utilizing on the PROJECT include:

- Orienting field personnel to the job-site and highlighting environmentally sensitive areas;
- Delineating/marking out the LOD at environmentally sensitive areas with orange construction fence;
- Installing tree protection fence to protect existing trees that may not need to be removed and leave existing vegetative buffers intact;
- Minimizing the amount of exposed area by designing proper phasing, strictly adhering to the construction sequence, and promptly stabilizing areas upon completion;
- Planning operations in detail to incorporate best practices and optimizing efficiency which reduces the duration of exposure to environmental impacts;
- Utilizing clear water diversions to prevent clean water from entering the work site;
- Installing silt fence/super silt fence to contain washout from imported materials to build up the road grade;
- Pumping/fluming water around the work site to install/modify culverts under the roadway;
- Dewatering in accordance with BMPs (i.e. filter bags and straw bales) if high groundwater is encountered;
- Limiting idling of diesel powered mobile equipment and reduce emissions by automatically shutting off idling after 10 minutes; and
- Utilizing newer technology for warm mix asphalt which lowers the temperature at which asphalt is produced, consumes less energy in production, and reduces emissions.